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After outlining the structural linguistic approach to form classes in general and Spanish nouns and adjectives in particular, the author concludes that "nouns and adjectives in Spanish cannot be characterized in any satisfactory fashion by their occurrence in morphological or syntactic frames." The grammatical framework used for this study is "the transformational model of linguistic description, as formulated by Chomsky (1957, 1964, 1965) and others." Major chapter headings are: 1. Introduction (Approaches to Word Classes, Criticisms); 2. Spanish Nouns and Adjectives (Structural Treatment, Transformational Grammar Model, Sub-Categorization Problems, Syntactic Features); 3. Discussion of Rules (Base Rules, Lexicon, Transformational Rules, Phonological Rules); and 4. Conclusions. Appended are a list of the rules of the grammar and a sample general linguistic terminology, the author has included brief definitions and examples of some of the basic concepts (sub-categorizational rules, syntactic features, complex symbols, etc.) which she uses in her analysis. (JD)

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A CHARACTERIZATION OF SPANISH NOUNS AND ADJECTIVES

by Claire E. Stevens

UNIVERSITY OF WASHINGTON
Studies in Linguistics and Language Learning
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CLAIRE E. STEVENS

STUDIES IN LINGUISTICS
AND
LANGUAGE LEARNING
VOLUME II

SEATTLE 1966

This volume is an unrevised thesis, submitted by Claire Stevens for the M. A. degree in Romance Linguistics at the University of Washington. It is an attempt to apply some of the more recent notions of generative grammar to Spanish.

This is the second volume in a series which will include Master's and Ph.D. theses completed at the University of Washington in problems of linguistics and language learning. We feel that these studies warrant the wider distribution made possible through publication in this form.

Sol Saporta
May, 1966

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1. INTRODUCTION

1.1 Approaches to Word Classes

The notion of word classes, or more traditionally "parts of speech", has been a subject of interest to students of language for centuries. As early as the fourth (and perhaps the fifth) century B.C., Greek philosophers and Indian grammarians were discussing their respective languages in terms of such categories or groups [de Groot, 1948; Robins, 1951]. However, in spite of the long history of this particular area of linguistic studies, no totally satisfactory theory of parts of speech has been arrived at.

Although there has been a lack of agreement both about the criteria used in formulating part of speech classifications and about the actual word classes postulated for a given language, there seems to have been general agreement about the need for dealing with languages in terms of some such groups.

The basic motivation for classifying the forms of a language into word classes or parts of speech has always been to provide simpler and more economic linguistic descriptions. That is, a description of the grammatical structure of a language cannot be conveniently stated in terms of the arrangements of specific forms (morphemes, words, or whatever unit is found to be most useful), since the total number of these forms in any language is large and such a view obscures obvious, relevant similarities. But linguistic descriptions can be significantly simplified if statements of grammatical structure are formulated so that they apply to all members of a given class as a whole.

Various traditions have existed for defining these word classes, and two in particular have been most frequently employed. The first approach, one often found in dictionaries and textbooks, utilizes semantic criteria in delimiting these groups. The familiar definition of a noun as "the name of a person, place or thing" is an example of a semantic definition (also called a "notional" definition), which attempts to define a class by the feature of meaning that is common to all the items in this class. For example, in his chapter on Spanish parts of speech, Gili y Gaya [1961, p. 99] writes:

> Los substantivos ... pueden designar personas (_Juan_), cosas (_árbol_), cualidades físicas o morales (_blancura_, _bondad_), acciones (_empujón_), estados (_quietud_), es decir, cualquier fragmento o aspecto de la realidad considerado como objeto independiente de nuestro pensar.

The great majority of modern linguists [e.g., Sapir, 1921, pp. 117-9; Bloomfield, 1933, pp. 172, 266-8] have condemned semantic definitions of parts of speech, at least for determining specific language word classes, on the grounds that they are too vague, imprecise and often contradictory to be of any value in linguistic descriptions. Chief among the objections to this semantic approach is the fact that the "meanings" on which such word classifications are based are not only not directly observable or accessible to the analyst, but are also bound to be subjectively interpreted by the investigator who will be unable to totally avoid imposing the metaphysics or basic concepts inherent in his own language on the phenomena he is analyzing [Robins, 1952, p. 295].

Modern structural linguistics, having stressed the obscurity of the semantic notions which underlie a definition of the parts of speech based on such criteria, has favored a second approach. Instead of non-formal, extra-linguistic criteria, these linguists have utilized formal criteria to define word classes. That is, definitions of the parts of speech are given in terms of the grammatical features of the language described, rather than in terms of any element of meaning. Two types of information may be used in formal definitions of the parts of speech: morphological and/or syntactic, along with the principles of mutual substitutability and similarity of distribution.

Representative of word class descriptions based primarily on morphological facts is the work on English structure of Trager and Smith [1951]. In their brief outline of English morphology, they isolate four word classes, based on the association of groups of base morphemes with four different "suffix-sets". The four classes turn out to correspond to the same parts of speech traditionally postulated for English (nouns, verbs, adjectives and pronouns), but an effort is made to describe the formal characteristics (i.e., inflectional suffixes) which distinguish these groups. Thus a noun will "show inflection for SINGULAR and PLURAL NUMBERS, and for POSSESSIVE CASE"; "pronouns show OBJECT case and two kinds of possessive"; "adjectives show COMPARATIVE and SUPERLATIVE"; and "verbs are inflected for 3D PERSON SG. NON-PAST, PAST, PAST PARTICIPLE, PRESENT PARTICIPLE" [p. 60].

A predominantly syntactic treatment of word classes has been undertaken by Fries [1952], who, in an effort to redefine the traditional English parts of speech, designates his groups by numerals and letters. Fries' method for arriving at classes first involves choosing as test "frames" certain minimum free utterances in English. Into these frames are substituted words from the investigator's corpus and according to Fries, those items which fill the same positions "without a change of the structural meaning" [p. 74] of the utterance are members of the same class. By following this procedure, Fries distinguishes four major word classes. For example, items belong to Class 1 if they can occur in either of the frames:

⟨The⟩ _____ is/was good.

_____s are/were good. [p. 77]

Similarly, to be considered as belonging to Class 3 a word must fit the frames:

⟨The⟩ _____ Class 1 is/was _____.

⟨The⟩ _____ concert is/was _____. [p. 82]

Many linguists who insist on a formal approach to such classifications use a combination of both morphological and syntactic information to define word classes. Gleason's [1961] treatment of English parts of speech is a simple example of an analysis which utilizes morphological features in defining some classes and syntactic features in defining others. He first isolates four "paradigmatic classes", each of which shows certain characteristics with respect to inflection. These four morphologically delimited groups correspond to the traditional nouns, verbs, adjectives and pronouns of English. For instance, the adjective paradigm is given [p. 96] as:

adj. stem
adj. stem {-ər}
adj. stem {-ɨst}

The rest *of the forms of* English not assigned to one of the four paradigmatic classes are assigned to syntactically defined classes, based on occurrence in "same or comparable environments in English utterances". Gleason suggests as a "hint" at characterizing such a syntactically defined class that prepositions are "used before nouns and at the ends of clauses with certain characteristic stress patterns" [p. 106], but does not elaborate any further.

It will be noticed that (with the possible exception of the position represented by Fries) inherent in both the formal and semantic approaches to word classes or parts of speech, although perhaps to differing degrees, is the notion that these categories or at least some of them, constitute a type of linguistic universal. That is, the fact that certain basic grammatical terms (such as "noun", etc.) are consistently utilized in descriptions of diverse and totally unrelated languages seems to imply that, at least in the analyst's mind, these categories are relevant across languages and that there is some relation or similarity between the units given the label "noun" in the descriptions of two different languages. The semantic definition attempts to provide an explicit basis for the view that such terms are universal by having the same definition for all languages. The formal definition uses the same terms but it is not made clear whether the utilization in different languages of these terms is significant or arbitrary.

A search for language universals has been characteristic of linguistic studies throughout their history and the cross-linguistic characterization of the major lexical categories has always been a goal of some interest. If it is established that these categories are in fact linguistic universals, then they will be characterized or defined abstractly once and for all in general linguistic theory, making explicit the basis for assigning two units in two different languages the same class or category label.

One problem then is to determine whether there are universal grammatical categories, and if so, what they are. The other problem is to actually formulate the necessary cross-linguistic characterizations of notions like "noun", "verb", etc. Modern linguists, as has been mentioned, have generally agreed that semantic definitions of such categories are unsatisfactory and imprecise. However, the type of word class definitions usually insisted on by these investigators, based as they are solely on specific formal characteristics of "surface structure" (see section 2.2), are necessarily unique to each language. Thus, the formally (and therefore uniquely) defined categories of one language can be only arbitrarily compared with the formally defined categories of other languages. To the extent that this is the case, the attempt to universally characterize such notions as "noun", "adjective", etc. must either be given up, or, the requirement that these categories must be defined solely in terms of formal features of the surface structure of a language must be abandoned. This particular question of the universality of part of speech categories will be returned to in section 4.

1.2 Criticisms

The formal approaches to word classes outlined in the previous section are all characterized by the use of diagnostic frames and substitution procedures. Modern structural linguistics has reacted against the vague and inadequate semantic approaches to defining word classes, in favor of a certain concept of scientific "rigor" which attempts to define all theoretical constructs or basic concepts (e.g., noun, sentence, etc.) in terms of operational procedures applied to "raw data" [See Lees, 1960b, pp. 207-10.]. According to this view, a notion such as "noun" must be defined in terms of directly observable physical properties of utterances and in such a way that the elements in a given string can be uniquely assigned to the proper classes by means of such properties and procedures of segmentation and classification (i.e., substitution in diagnostic frames).

This view of theoretical constructs is related to the desirability of using nothing but "raw data" (i.e., only the corpus, but not hunches, etc.) in the construction of adequate grammars. However, this is an unreasonable and unnecessary view of linguistics. The important thing about a grammar (which constitutes a theory about a language) is how well it describes all the relevant data, not how this grammar (or theory) was arrived at. Thus, attempts to "rigorously" define notions such as "noun" in terms of occurrence in a particular diagnostic frame are irrelevant to how well this category may function in a linguistic description. Similarly, merely making explicit how one arrived at the linguistic construct does not guarantee that it will function adequately in the total theory.

Furthermore, in addition to the fact that defining word classes by means of their occurrence in diagnostic frames is unnecessary and places an unreasonable demand on linguistic theory, common substitutability in diagnostic frames will rarely serve to adequately characterize notions such as "noun" anyway. There is first of all the problem of which frame to choose for each substitution operation. No algorithm, procedure or justification is ever given for the selection of this correct frame from all the possible frames that exist. There always seem to be members of a class which will not fit a given frame (e.g., The man is good/*The men is good; or "quick, quicker, quickest/ good, *gooder, *goodest"). In this case the analyst always appears free to change or add to his frames whenever the need arises. Similarly, there are items which we would not want to say belong to the class in question, but which often fit the frame chosen (e.g., "on, honor, honest"), thus forcing the analyst to add numerous ad hoc restrictions (like "meaning") to limit the frames examined.

Moreover, in choosing a frame one is faced with two extremes. First, we might require that two items, to be members of the same class, must share all environments in common; that is, they must be completely substitutable, with identical distributions. But this is surely unrealistic, since in any natural corpus no two items will usually have the same exact set of contexts. The logical result will be classes which contain only a single member. These one-member classes cannot be used to predict any utterances beyond the original corpus, and are therefore useless. Second, we might choose one environment and designate that any items which can occur in this one frame are members of the same class. This would produce a smaller number of classes, each with many more members than the classes based on one hundred percent substitutability. However, since there is no way to decide which environment to pick, a single diagnostic frame must be arbitrarily selected. This can quickly lead to inadequate and even absurd results, since many items which undoubtedly should be in different categories will share some one common environment, e.g.,

Ella come pan.

Ella come bien.

Thus substitution in total environments is too narrow and substitution in a select environment is too broad to yield useful classes which will allow the proper generalizations. Furthermore, in both cases (classes based on substitution in all environments and classes based on substitution in one environment) there is a certain logical circularity involved. Since no procedural method exists for choosing a frame, a reasonable result can be obtained only if the correct frames are already known. If we know which blank in which frame to use to get a particular class of items, then we must already know the members of the class, to have chosen the exact frame that would fit them all. We "discover" a class of nouns in a given language because we know which frame to set up to get them. We keep looking until we find a frame that yields what we want. With this in mind, the whole procedure of picking frames seems fairly pointless.

Another major problem connected with the use of diagnostic frames is the question of determining whether the string that results after a substitution is "the same as" or "different from" the string before the substitution. Since no justification or algorithm is offered for determining this "sameness", it would be left to the analyst's judgment to decide. Obviously, we reject the absurd dicen que él as a nominal in the frame "_______ es bueno" by saying that dicen que él es bueno is not the same type of construction as el hombre es bueno or Juan es bueno. But, on what basis? Since a construction is at least partly defined in terms of classes, we must already know that these two constructions contain different classes. The question of "sameness of grammatical form" is thus also subject to circularity since we already know (and use) the very information about grammatical structure which the substitution-in-frames technique is supposed to illuminate.

Section 2.1 deals with the application of these views to Spanish and an alternative formulation will be proposed in section 2.2.

2. SPANISH NOUNS AND ADJECTIVES

2.1 Structural Treatment

In Spanish the noun and adjective categories are particularly relevant for a consideration of the problems inherent in attempts to define or distinguish word classes. Various approaches have been utilized to arrive at a characterization of these two classes. A definition such as that of Gili y Gaya [1961] quoted in section 1.1 is representative of the kind of semantic definitions which have been proposed. The formal definitions offered by modern descriptive linguists have utilized both morphological and syntactic criteria in delimiting the noun and adjective classes in Spanish.

Inflection for gender and number is characteristically used as a morphological criterion for separating nouns from adjectives. Hall [1945, p. 24] holds that both nouns and adjectives are inflected for number, but that nouns are inflected for only one gender while adjectives are distinguished from nouns by being inflected for both masculine and feminine gender. Stockwell, Bowen, and Martin [1965, pp. 42, 47] maintain a similar but slightly different position. They assert that both nouns and adjectives are inflected for the category number, while adjectives are distinguished from nouns by being inflected for gender.

However, it is difficult to conclude that these definitions in terms of diagnostic frames of inflection for gender or number are very satisfactory. First of all, neither proper nor mass nouns (e.g., Juan, arroz) normally occur inflected for plural number. Similarly there are numerous items traditionally considered to be adjectives which either do not occur in the plural (e.g., cada, numbers) or never occur as singulars (e.g., ambos). Second, it is hard to see why a noun such as hermano/-a is not inflected for gender (or only for one gender, according to Hall) but azul is inflected for gender (or for both genders, again according to Hall). That is, the attempt to distinguish nouns and adjectives on the basis of inflectional diagnostic frames requires some ad hoc manipulations since the apparently similarly inflected muchacho/muchacha and bueno/buena would never seriously be placed in the same class, and in spite of an apparent difference in inflection, bueno/buena and azul would be assigned to the same class [Saporta, 1962, p. 284].

Other morphological criteria for distinguishing nouns and adjectives have been proposed, but in each case the diagnostic frame chosen fails to uniquely characterize the classes in question. In some cases, the frame includes more items than are felt to belong to a particular class and in other cases the frame chosen does not include all clear cases of members of the desired class. For instance, adjectives are supposed to be able to occur before a -mente suffix to form a manner adverbial, but not all adjectives do (e.g., *verdemente).

Formal definitions in terms of syntactic frames have also been proposed for Spanish nouns and adjectives. Occurrence in the position after the comparative más or after the neuter article lo characterizes many but not all and only adjectives (e.g., lo poeta [Ramsey, 1956, p. 64], más hombre). Similarly, a frame such as "el________" may include all masculine nouns (e.g., hombre) but will also include some non-nouns (e.g., bueno). In short, it appears to be the case in general that items usually felt to be nouns or adjectives can co-occur in four possible ways: noun plus noun -- el hombre abogado; adjective plus adjective (rarely) -- el bueno simpático; noun plus adjective -- el hombre simpático; and adjective plus noun -- la blanca nieve, thus indicating that many items in the two classes can occupy the same syntactic positions.

The only possible conclusion is that nouns and adjectives in Spanish cannot be characterized in any satisfactory fashion by their occurrence in morphological or syntactic frames. Clearly the examples cited above have to be accounted for in any adequate description of Spanish and part of such a description will involve distinguishing these two word classes, but some approach other than that of diagnostic frames must be considered.

2.2 Transformational Grammar Model

The framework within which this study of Spanish nouns and adjectives has been carried out is the transformational model of linguistic description, as formulated by Chomsky [1957, 1964, 1965] and others. This view of linguistic description has as its goal the explication of the competence rather than the actual performance of an ideal user of the language in question, and considers the grammar of a particular language to be a theory which will specify all the (indefinitely large number of) grammatical sequences, both potential and actually occurring, of that language, assigning a uniformly correct structural description to each sequence.

A grammar of this sort is conceived of as a system of rules, part of which generate a restricted set of abstract, underlying structures (called "deep structures") from which are constructed actual sentences (called "surface structures") by means of other rules called grammatical transformations. The first type of rule, the base rules, characterize a set of elementary structures, while the full range of sentences can be characterized by the surface structures which result from the operations of the transformational rules. The fact that the surface structure of a sentence may differ greatly from the deep structure of that same sentence, though determined by it, is one of the most crucial notions of transformational grammar. This distinction between surface and deep structure allows a transformational grammar to reveal or make explicit relationships between structures which are intuitively felt but are not evident in the surface structure and conversely, structures which are superficially identical are revealed to be different; e.g.,

Atacan los aviones.

in which aviones can be either the subject or the object of the verb, a fact which is obscured in the representation of the surface structures (which are identical) but revealed by the different underlying structures.

A grammar that purports to describe a speaker's competence in his language must also account for his intuitive notions about word classes. That is, the fact that Juan, camas, muchacho are felt to be in some sense "the same", i.e., that they share some feature, in spite of obvious morphological and syntactic differences, must be reflected by the grammar. A transformational grammar provides a formalization of this intuitive notion of word classes in a natural way, by showing that such items as Juan, camas, and muchacho ultimately derive from the same node (or category symbol) in the grammar, by means of some intervening rules. The grammar itself provides a definition of the relevant word classes. That is, it demonstrates in what way the above items are the same class by showing that they go back to the same node, even though they may have nothing in common physically (in terms of distribution or diagnostic frames). Transformational theory does not require that theoretical constructs such as "noun" be defined in terms of some procedures or operations on data (even if feasible), but rather holds that the theory and the grammar itself provide a definition of the constructs posited. Such constructs, which are originally selected for their usefulness, are ultimately justified by the adequacy and simplicity of the theory which makes use of them [Bach, 1964a, pp. 28-9].

2.3 Sub-Categorization Problems

In a transformational grammar the utilization of major lexical categories or word classes (i.e., noun, verb, etc.) simplifies the description of the constituent structure of strings as well as the specification of the domains of transformational rules. Such categories have been introduced by means of rules of the form X ⟶ Y (in terms of which each sentence of the language has a derivation from S and such that a structural description of the generated sentences is uniquely reconstructible from the derivation). For example:

NP ⟶ Det + Noun

The actual representatives of these word classes (i.e., the lexical items themselves) could be introduced by late disjunctive rules of the same type in which a lexical category symbol is rewritten as a list of items:

Noun ⟶ libro, mujer, sinceridad, ...

However, it is generally agreed that in order to account for the linguistic competence of a native speaker of a language, the grammar must provide more information than this about the major lexical categories. That is, such categories as noun, verb, etc. must be differentiated into sub-classes in some fashion since many rules in the grammar are relevant for or apply to a feature of some sub-classes of a particular lexical category but not others. For example, in Spanish, determiners can occur only before common nouns and not proper ones, the so-called "personal a" must be inserted only before human nouns when they are the direct object of a verb, certain verbs occur only with animate nouns as subject, etc. Obviously a grammar of Spanish must reflect the fact that these are relevant sub-categories of nouns.

The approach formerly adopted in transformational grammars has been to handle this type of information by means of the same sort of rewriting or phrase structure rules, as shown in the following illustrative example:

1. $$\text{Noun} \longrightarrow \begin{Bmatrix} N_{\text{masc}} \\ N_{\text{fem}} \end{Bmatrix}$$

2. $$N_{\text{masc}} \longrightarrow \begin{Bmatrix} N_{\text{masc anim}} \\ N_{\text{masc inanim}} \end{Bmatrix}$$

3. $$N_{\text{fem}} \longrightarrow \begin{Bmatrix} N_{\text{fem anim}} \\ N_{\text{fem inanim}} \end{Bmatrix}$$

4. $$N_{\text{masc anim}} \longrightarrow \begin{Bmatrix} N_{\text{masc anim prop}} \\ N_{\text{masc anim comm}} \end{Bmatrix}$$

5. $$N_{\text{masc inanim}} \longrightarrow \begin{Bmatrix} N_{\text{masc inanim prop}} \\ N_{\text{masc inanim comm}} \end{Bmatrix}$$

6. $N_{\text{fem anim}} \longrightarrow \begin{Bmatrix} N_{\text{fem anim prop}} \\ N_{\text{fem anim comm}} \end{Bmatrix}$

7. $N_{\text{fem inanim}} \longrightarrow \begin{Bmatrix} N_{\text{fem inanim prop}} \\ N_{\text{fem inanim comm}} \end{Bmatrix}$

8. $N_{\text{masc anim prop}}$ ⟶ Juan, ...
9. $N_{\text{masc anim comm}}$ ⟶ muchacho, ...
10. $N_{\text{masc inanim prop}}$ ⟶ México, ...
11. $N_{\text{masc inanim comm}}$ ⟶ libro, ...
12. $N_{\text{fem anim prop}}$ ⟶ María, ...
13. $N_{\text{fem anim comm}}$ ⟶ mujer, ...
14. $N_{\text{fem inanim prop}}$ ⟶ España, ...
15. $N_{\text{fem inanim comm}}$ ⟶ cama, ...

This set of rules provides for some of the needed differentiation of the category noun into sub-classes, but there are several other sub-categories which will prove to be relevant for Spanish nouns, which have not been included in these rules -- i.e., human/non-human, abstract/concrete, count/mass, etc.

However, there are some serious objections to a set of rules of this type, as has been pointed out by Lees [1960, pp. 37-8, 51], Schachter [1962], Bach [1964] and Postal [1964, pp. 74-5]. First, a set of rewriting rules such as the above exhibits a great deal of repetition. Once the first division into masculine vs. feminine is made, the second division into animate vs. inanimate requires two rules since it must apply to both masculine and feminine nouns and produce exactly parallel changes. The third division into proper vs. common requires four rules since it must apply to masculine-animate, masculine-inanimate, feminine-animate and feminine-inanimate, and so forth. When some of the other sub-categories needed are added, the problem is complicated correspondingly.

It should be noticed that the ordering of these rules is arbitrary. There is no particular reason why the first sub-division must be into masculine vs. feminine rather than into say count vs. mass. In fact, the above set of rules could alternatively be given as:

$$\text{Noun} \longrightarrow \begin{Bmatrix} N_{anim} \\ N_{inanim} \end{Bmatrix}$$

$$N_{anim} \longrightarrow \begin{Bmatrix} N_{anim\ prop} \\ N_{anim\ comm} \end{Bmatrix}$$

etc.

But whichever distinction is arbitrarily chosen as the first sub-division will then be dominant while the other distinctions are obscured and the rules consequently tend to give the impression that certain distinctions are in fact more important than others.

Second, it will be observed that the sub-categories given on the right-hand side of all the above rules are totally unrelated. That is, $N_{masc\ anim}$ is completely distinct from $N_{fem\ anim}$, just as say noun is distinct from verb. Using the first set of rules suggested above, it is quite simple to state a rule that applies to masculine or feminine nouns alone. However, presumably there are times when we would like to make statements about, for instance, all proper nouns, without regard to their gender or animateness (e.g., that determiners do not precede them), but this cannot be done directly now. A rule that applies to all proper nouns must be stated in terms of the unrelated categories: $N_{\text{masc anim prop}}$, $N_{\text{masc inanim prop}}$, $N_{\text{fem anim prop}}$, $N_{\text{fem inanim prop}}$. Clearly, in terms of economy and simplicity, this is a rather large sacrifice to make, especially when it is recalled that there are additional relevant sub-categories which should also figure in the above set of rules.

Certainly some sort of generalization is being missed since these rules do not reflect the relations that obtain among the nouns in question. That is, on the one hand Juan and México belong in a class together as proper nouns, while muchacho and libro belong in a class together as common nouns. But on the other hand, Juan and muchacho belong in a class together as animate nouns while México and libro belong together as inanimate nouns. However, the rules, as they stand, do not reflect this fact.

So, this type of rule, at least for providing the desired information about the sub-classes of lexical categories, appears to be unsatisfactory. The problem resides first in the fact that the sub-categorization of a given lexical category involves some cross-classification rather than strictly hierarchic relations. That is, some of the various sub-classifications are independent of each other. For example, the classification of nouns with regard to whether they are animate or inanimate is independent of their classification with regard to whether they are proper or common. Several of the relevant sub-categories cross or intersect with one another, and since some of the categories are not simply sub-categories of any other, such sub-categorizations cannot be naturally organized or treated in any exclusively hierarchical way.

Second, rewriting rules of the usual sort (X ⟶ Y) are characterized specifically by the fact that they do impose strictly hierarchical structure, in which one category is analyzed into a sequence of sub-categories. So, since the information about sub-categories which is needed for subsequent rules of the grammar is not strictly hierarchically organizable in any natural way, the use of rewriting rules, which can provide only hierarchic sub-classifications, can only result in extremely repetitious and uneconomical complications. Nor can transformational rules overcome the inadequacies of rewriting or phrase structure rules with regard to problems of cross-classification or sub-categorization, for the area in question is found in the part of the grammar which must be correctly characterized before transformations ever apply. Clearly some new type of rule is needed.

One of the main advantages of a transformational grammar approach to Spanish is the treatment of "concord" or "agreement" which it makes possible. The usual statement that Spanish articles and adjectives agree in gender and number with the noun they modify indicates that the simplest way to describe agreement would be by a rule that adds the elements of gender and number found to be present with a given noun to any article and/or adjective which may accompany it.

As has been shown by Postal [1964, pp. 43-6], phrase structure or rewriting rules of the usual sort cannot by themselves handle agreement phenomena in any fashion that even approaches the simplicity of the traditional statement. Instead of the repeated rewriting rules required by a phrase structure grammar, transformational rules provide a simple way of characterizing the generalization embodied in the traditional statement which rewriting rules have failed to illuminate. If we have the following rewriting rules:

$$\text{Noun} \longrightarrow \text{Noun Stem} + \text{Affix}$$
$$\text{Affix} \longrightarrow \text{Gender} \ \langle\text{Plural}\rangle$$
$$\text{Gender} \longrightarrow \begin{Bmatrix}\text{Masc}\\ \text{Fem}\end{Bmatrix}$$

then a simple transformational rule such as the following:

$$\begin{gathered}\text{Det, Noun Stem} + \text{Affix, Adj} \Longrightarrow \\ \text{Det} + \text{Affix, Noun Stem} + \text{Affix, Adj} + \text{Affix}\end{gathered}$$

says that whatever the gender-number Affix of the noun is, the same Affix is adjoined to the Determiner and Adjective constituents (if present in a string). Since gender and number (i.e., Plural) derive from the same node (Affix), a transformational grammar can have one rule to deal with both types of suffixes at once by referring to this higher node. That is, if we had

un, muchach + Masc + Plural, buen,

the transformation would operate to give

un + Masc + Plural, muchach + Masc + Plural, buen + Masc + Plural,

which eventually by means of the phonological rules would result in unos muchachos buenos.

However, it is precisely due to the type of information needed by the phonological rules to give the affix the proper phonological shape that we are confronted with a further serious problem. In order for the rewriting rules to generate the proper strings on which the transformational agreement rule and the phonological rules can operate, we must consider the following.

First of all the noun stems which have variable gender (i.e., can take either a masculine or a feminine gender affix: herman-o/-a) must be separated from those which have invariable gender (i.e., can take only a masculine gender affix or a feminine gender affix: hombre, libro, mujer, cama). Second, both nouns and adjectives must also be sub-divided according to the type of phonological shape the gender affix will assume when attached to them. We may give this sub-division the label "morphological class". This affix will be either

o ~ a	herman-o/-a, buen-o/-a,
Ø ~ a	señor- /-a, español- /-a, or
e ~ a	jef-e/-a (for nouns only).

These are the forms which have overt markers for the masculine/feminine contrast. Elsewhere this affix will have to be zero (*papel*, *mujer*, *libro*, *cama*, *socialista*, *modelo*, *azul*, *interesante*). Thus the particular suffix which co-occurs with a noun stem is determined partly by the morphological class to which the noun belongs (*herman-* vs. *señor-*) and partly by whether the noun stem has variable or invariable gender (*señor-* vs. *papel*). On the other hand, the particular suffix which co-occurs with an adjective (after the agreement transformation) is determined first by this adjective's morphological class (*buen-* vs. *azul*), but also by the gender assignment of the noun which accompanies it (masculine vs. feminine).

Thus in order to secure the proper co-occurrences of various representatives of the gender affix with nouns and adjectives, it would be necessary to have rewriting rules of the following sort, which sub-divide these lexical categories on the basis of morphological criteria:

1. Adjective $\longrightarrow \begin{Bmatrix} \mathrm{Adj}_1 \\ \mathrm{Adj}_2 \end{Bmatrix}$

2. $\mathrm{Adj}_1 \longrightarrow$ interesante, azul, socialista, joven, ...

3. $\mathrm{Adj}_2 \longrightarrow \begin{Bmatrix} \mathrm{Adj}_{2a} \\ \mathrm{Adj}_{2b} \end{Bmatrix}$

4. $\mathrm{Adj}_{2a} \longrightarrow$ buen-, content-, bonit-, viej-, ric-, ...

5. $\mathrm{Adj}_{2b} \longrightarrow$ español-, ...

plus similar rules dividing, e.g., variable noun stems (NS_v):

6. $\mathrm{NS}_v \longrightarrow \begin{Bmatrix} \mathrm{NS}_{va} \\ \mathrm{NS}_{vb} \\ \mathrm{NS}_{vc} \end{Bmatrix}$

7. $\mathrm{NS}_{va} \longrightarrow$ muchach-, alumn-, viej-, ric-, católic-, ...

8. $\mathrm{NS}_{vb} \longrightarrow$ español-, señor-, ...

9. $\mathrm{NS}_{vc} \longrightarrow$ monj-, jef-, ...

After the agreement transformation operates to associate the noun's affix with any adjective and/or article present, a phonological rule such as the following would be necessary:

1. $\mathrm{Masc} \longrightarrow \left\{\begin{array}{l} \mathrm{e}/\mathrm{NS}_{vc}\underline{\quad} \\ \mathrm{o}/\mathrm{NS}_{va}\underline{\quad},\ \mathrm{Adj}_{2a}\underline{\quad} \\ \emptyset \text{ elsewhere} \end{array}\right\}$

Notice that since in many cases (e.g., *hombre*, *mujer*, *socialista*, *azul*, *interesante*, etc.) the gender affix is never phonetically realized, the grammar must give specific context-sensitive phonological rules which state that in certain environments the gender affix is realized as zero.

Furthermore it is clear that morphological sub-classifications of Spanish nouns and adjectives (which are necessary to insure the occurrence of the proper suffix with each stem) cut across any of the types of necessary subcategorizations for nouns based on syntactic criteria which were discussed at the beginning of this section, thus doubly complicating the problem already outlined. That is, the type of suffix a noun takes is not strictly determined by whether the item in question is proper or common, e.g., *Juan*/*Juana* and *señor*/*señora* both exhibit Ø ~ a suffixes. If a division into common vs. proper nouns is made first, then the same set of rules (as given above) will have to be given twice (once for common nouns, once for proper nouns) for the necessary morphological classes.

The kind of agreement transformation suggested is still highly desirable but the only type of rewriting rules available to present relevant information on which the transformation operates, do so in an unsatisfactory manner. Once again, it is seen that rewriting rules of the usual sort are inadequate to handle the types of sub-categorization (syntactic or morphological) which arise and which must be described before transformational rules can apply.

2.4 Syntactic Features

Chomsky [1965] has proposed a modification of the syntactic component of a transformational grammar which provides a solution to the problems discussed in the previous section. The remainder of this study constitutes an attempt to utilize Chomsky's new formulation of transformational grammar to characterize Spanish syntax, with particular attention to nouns and adjectives.

Chomsky [p. 80] points out that the sub-categorization problem in syntax has an analogue on the phonological level, where a given sound is cross-classified independently with respect to the categories of, say nasality and palatalization. In the phonological component of the grammar there may be rules that should apply to palatalized consonants, e.g. [l̃] and [ñ], but not to unpalatalized [l] and [n], while other rules may apply to nasals, [m], [n] and [ñ], but not to non-nasals, [l] and [l̃]. Treating sound segments as indivisible entities involves precisely the same difficulties as those discussed above for nouns. But, if each sound segment is considered as a set of phonological features rather than indivisible entities and the phonological component is permitted to contain rules which apply over features or combinations of features, the desired result can be achieved in a maximally revealing and economic fashion [Halle, 1962]. Then a rule can be specified to apply to all segments with the feature [+ Palatal] ([l̃] and [ñ]), regardless of whether these segments are [- Nasal] ([l̃]) or [+ Nasal] ([ñ]).

Chomsky has proposed the same sort of a solution, i.e., a representation of morphological segments in terms of features rather than morphemes, for the type of problem discussed in section 2.3. Since this proposal constitutes essentially an adaptation of the solution formulated for the phonological component, adopting it does not require any radical changes in or additions to grammatical theory.

Chomsky's proposal involves the abandonment of the rewriting rules of the form X ⟶ Y for the introduction of the representatives of lexical categories. Instead, the base of the grammar will contain a separate lexicon, which contains a list of all of the lexical items of a language. Each lexical entry will have associated with it a set of syntactic, semantic and phonological features. Many of the idiosyncratic properties of a lexical item can now be specified in the lexicon as syntactic features and this results in simplifications of the rewriting rules of the base. For instance, the rewriting rules do not need to classify verbs into transitive and intransitive, this feature being specified in the appropriate lexical entries.

In addition to the other rewriting rules of the base (those that do not introduce lexical items), there will be rules which analyze lexical category symbols into complex symbols (i.e., sets of specified syntactic features). In the case of the lexical category noun, context-free subcategorization rules will introduce "inherent" features such as [Count], [Animate], [Human], etc. In the case of lexical categories such as verb and adjective, context-sensitive rules will operate to introduce contextual features (either in terms of category symbols ("strict subcategorization" features) or in terms of feature specifications ("selectional" features). For example, if the string (NP Verb NP) has been generated, then the strict sub-categorization feature [+___NP] (i.e., "occurs before NP") will automatically be added to the complex symbol representing Verb in the pre-terminal string. In the lexicon, a verb like *admira-* will be marked [+___NP] indicating that it can be inserted in place of the complex symbol representing Verb, while a verb like *duerme-* will be marked [-___NP]. Similarly, if the string ([+Noun,... +Human] Cop Adj) is generated, then the selectional feature [+(+Human)...___] will be added to the complex symbol representing Adjective. So, *guap-* will have the feature [+(+Human)...___] and can be inserted, but *triangular* with the feature [-(+Human)...___] cannot be inserted. Thus the base rules will generate a pre-terminal string that will contain various sets of syntactic features and lexical items can be inserted in these strings provided the syntactic features associated with these lexical entries are not distinct from the complex symbols of the pre-terminal string. The notion "is a" (by which items are shown to be members of the same class by virtue of the fact that they ultimately derive from the same higher node in the grammar) still holds true with only slight modification (see section 4).

Since the new type of rules which introduce complex symbols actually apply to phrase-markers (and utilize information about earlier steps in the derivation), rather than to just the last string in a derivation, they are in fact transformational rules. A base component with this type of rule is no longer just a phrase structure grammar.

Notice that these rules generate nouns in an essentially independent fashion and then select verbs and adjectives in terms of these nouns. This procedures makes an implicit claim that correpponds to the traditional notion, expressed in the following quotation from Gili y Gaya [1961, p. 99], that subject nouns determine the choice of verbs and adjectives in the same sentence:

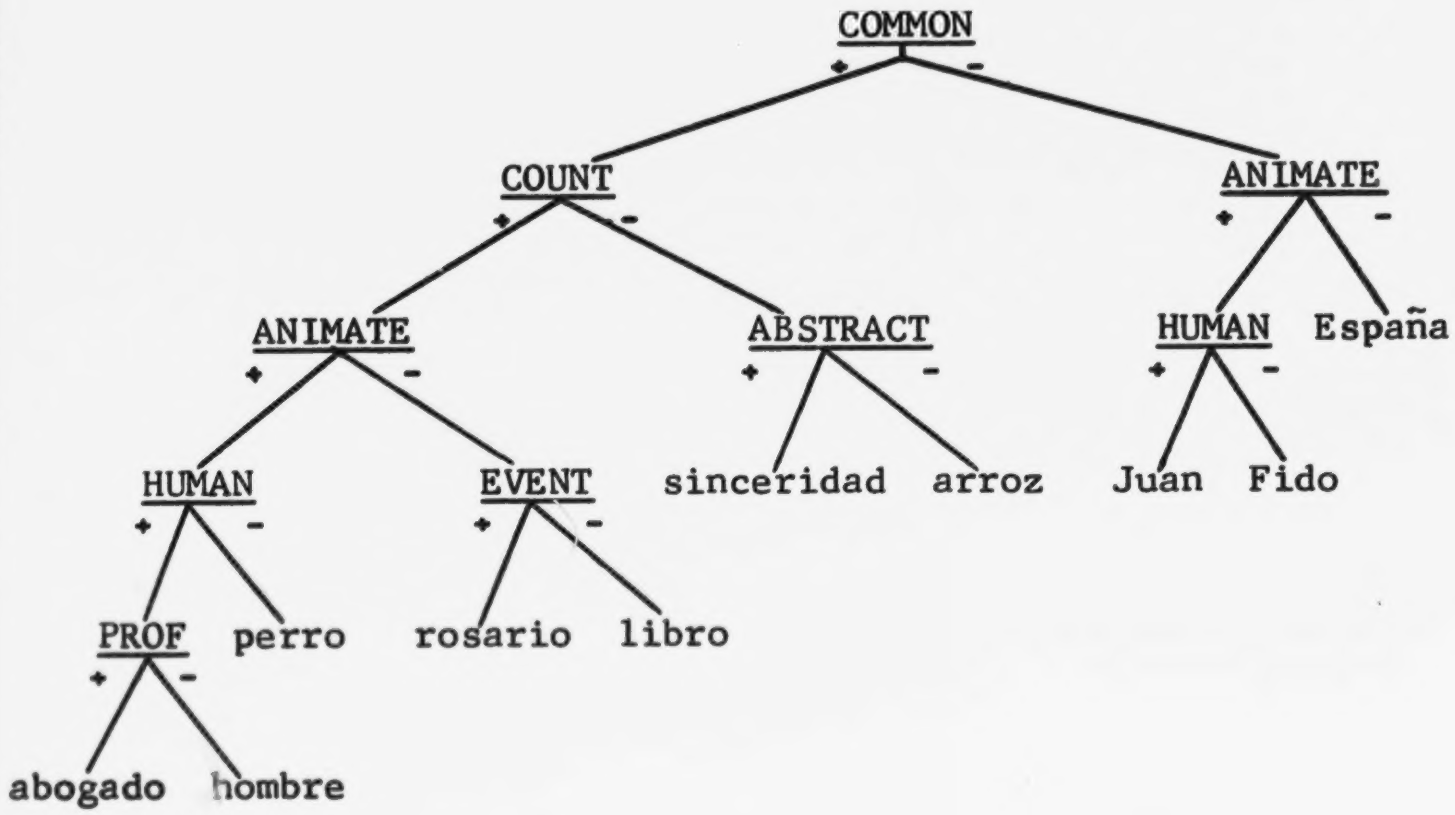
> Los substantivos se piensan en sí mismos, como representaciones o conceptos _independientes_.... Los adjetivos y los verbos son necesariamente _dependientes_: se piensan y expresan adheridos a un substantivo. Un adjetivo necesita referirse a un substantivo, al cual añade notas que lo determinan o precisan.

And in fact Chomsky shows that the other alternative, i.e., picking nouns in terms of a prior selection of adjective or verb, results in a severe loss of simplicity in the grammar.

Where necessary, transformational rules can now apply to specified syntactic features. This reformulation of the syntactic component will be discussed and illustrated in detail in section 3.

The contextual features ("strict sub-categorization" or "selectional") utilized in a grammar arise exactly from the elements selected during the operation of the base rules. It is worthwhile, however, to examine the types of "inherent" features introduced by the application of the context-free rule of the base which applies to the category symbol Noun. The tree diagram on the following page is intended as a graphic representation of the sub-categories of Spanish nouns.

Notice that, as mentioned in section 2.3, some of


COMMON
+
-
COUNT
+
-
ANIMATE
+
-
ANIMATE
+
-
ABSTRACT
+
-
HUMAN
+
-
España
HUMAN
+
-
EVENT
+
-
sinceridad
arroz
Juan
Fido
PROF
+
-
perro
rosario
libro
abogado
hombre

these sub-classes of nouns are strictly sub-categories of some others (e.g., all human nouns are a sub-class of animate nouns) while other sub-classes do not strictly constitute sub-categories of any others (e.g., some animate nouns are common, some are not).

Thus, human nouns must be distinguished because, among other reasons, the "personal a" must be inserted before these nouns when they are the direct object of (most) transitive verbs, e.g.:

Veo el libro.

Veo a Juan$_{[+\text{Human}]}$.

Abstract nouns are separated from non-abstract since some verbs do not allow an abstract object:

Cuece el arroz$_{[-\text{Abstract}]}$

*Cuece la sinceridad$_{[+\text{Abstract}]}$

Animate nouns constitute another relevant sub-class of this lexical category, since, for example, certain verbs require animate subjects.

El hombre$_{[+\text{Animate}]}$ come.

*El libro$_{[-\text{Animate}]}$ come.

The sub-class of count nouns is distinguished since those items which are non-count (i.e., "mass") nouns ordinarily have no plural; e.g.:

El arroz$_{[-\text{Count}]}$ está rico.

*Los arrozes están ricos.

The common/non-common distinction for nouns is relevant since for many dialects non-common (i.e., "proper") nouns do not occur after determiners:

El perro$_{[+\text{Common}]}$ no es bueno.

*El Fido$_{[-\text{Common}]}$ no es bueno.

The sub-class of human nouns which refer to professions (actually profession, social or economic class, political or religious group) must be distinguished so that a transformational rule can place professional nouns in the predicate immediately after their subject nouns:

Mi hermano que es un abogado$_{[+\text{Prof}]}$ vive en México.

$\Longrightarrow$ Mi hermano abogado vive en México.

The sub-class of non-animate nouns which refer to events must also be singled out. Although *estar* and never *ser* precedes locative adverbs everywhere else, the copula preceding a locative adverb must be *ser* if the subject noun is the name of an event.

El libro está aquí.

La sinfonía$_{[+\text{Event}]}$ es aquí.

Chomsky's new formulation, in which morphemes are no longer viewed as being indivisible entities but rather as having sets of features associated with them, obviates the need for base rules that sub-divide lexical categories according to properties which are not relevant for the functioning of these base rules. The use of syntactic features can also be extended to the description of inflection and agreement (which were discussed in the preceding section), as will be illustrated in section 3.

3. DISCUSSION OF RULES

In this section some of the rules needed to generate Spanish sentences, taking into account the considerations raised in section 2, are discussed.

A generative grammar which purports to describe a Spanish speaker-hearer's underlying system of rules contains three components. The syntactic component consists of a base which generates deep structures and a transformational sub-component which maps the deep structures into surface structures. Deep structures are given a semantic interpretation by the semantic component of the grammar and surface structures are given a phonetic interpretation by the phonological component. These latter two components are interpretive only and play no role in the "creative" generation of sentence structures. The semantic component is occasionally referred to but is given no specific treatment in this study. Similarly, although a few rules from the phonological component are presented, it is also given only brief attention.

3.1 Base Rules

The base of the syntactic component itself consists of a categorial sub-component and a lexicon. The categorial sub-component involves two kinds of context-free rewriting rules that apply to symbols for lexical categories. The first type of rule involves rewriting a category symbol as a non-null string of symbols and usually involves some sort of branching or hierarchical structure, as each string of a sequence of strings is derived from the one just before it by applying one of the rewriting rules. The second type of rule involves an introduction of or an operation on complex symbols (i.e., sets of syntactic features) and these rules are a type of transformational rather than phrase or constituent structure rule, as were the first type. A string generated by this system of rewriting rules is called a pre-terminal string. The first six rules of the base (as given in Appendix 1) are of the usual rewriting or phrase structure sort which involve branching and hierarchical relationships.

* [B-1] S $\longrightarrow$ NP VP

The first rule of the base asserts that a sentence (S) consists obligatorily of a noun phrase (NP) plus a verb phrase (VP). Although it is true that there are many Spanish sentences which consist only of a verb phrase, such as

Duermen ahora.

Están contentas.

these sentences are the result of a later transformational rule (T-25) which may optionally delete the subject noun phrase from a sentence such as

Los hombres duermen ahora.

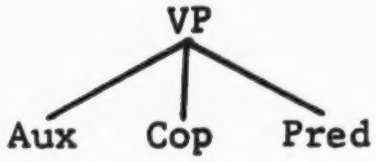
Las muchachas están contentas.

Since, e.g., number and person for verbs, and number and gender for adjectives, in the VP are solely dependent on the nature of the noun chosen for the subject NP, it is clear that this NP must still be present until after the application of the two agreement transformations which cause the verb to "agree with" the subject NP in number and person (T-6) and any adjectives to "agree with" the same NP in gender and number (T-4). Once the obligatory agreement transformations have applied, the subject NP can be optionally deleted by T-25.

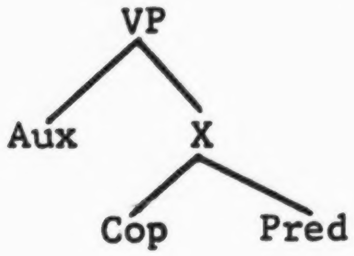
$$* \ [\underline{\text{B-2}}]\ \text{VP} \longrightarrow \text{Aux} \begin{Bmatrix} \text{Copula} \begin{Bmatrix} \text{Pred} \\ \text{Adv} \\ \text{S'} \end{Bmatrix} \\ \text{Verb} \ \langle \text{S'} \rangle \ \langle \text{NP} \rangle \end{Bmatrix} \langle \text{Adv} \rangle$$

B-2 states that a verb phrase can be developed in several different ways. First the element Aux must be obligatorily chosen. Next either Copula or Verb may be selected. A copula may be followed by a predicate (Pred), by an adverb (Adv) or by another sentence (S'). Similarly, a verb may optionally be followed by either S' or an NP. In addition, the combinations of Copula or Verb plus any of the elements mentioned may be optionally followed by an adverb.

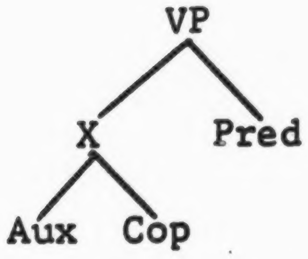
Notice that this rule says that Aux is related equally to any of the other elements that may be chosen in this rule, i.e., that it is related both to Cop and to Pred. A tree representation of this relationship would be the following:



It may be that a rule which assigns either the structure



or the structure



is to be preferred. If so, B-3 must be altered accordingly.

The initial symbol for sentence is introduced twice as S' in certain positions in this rule (and is also introduced in B-12, the NP rule) and the rules of the base are then allowed to apply, in order, cyclically and successively to each occurrence of S. The purpose of allowing the reintroduction of S in a derivation is to permit the insertion of base phrase-markers into other base phrase-markers. This procedure can be repeated without limit, thus providing the grammar with an infinite generative capacity. For example, the rules of the base might generate the following sequence:

S ⟶ NP VP
NP V S'
D N V S'

The rules of the base then reapply to this new occurrence of S, resulting in:

D N V [NP VP]

D N V [NP Cop Pred]

D N V [NP Cop Adj]

D N V [D N Cop Adj]

El hombre llega [El hombre está contento]

Since there are no more occurrences of S, the base rules would not be reapplied to this string. A string formed in this way is called a generalized phrase-marker. Eventually T-12 would operate on this phrase-marker to produce:

El hombre llega contento.

Transformational rules will apply to a generalized phrase-marker of this sort to embed each string into the one above it. This recursive property of the base component, which allows the reintroduction of S is thus responsible for the generation of all sentences which have two or more underlying sentences as their origin. The workings of these generalized phrase-markers will be discussed further and illustrated in the section on transformational rules (3.3) and in Appendix 2.

Rule B-2 as stated appears to permit any members of any of the different lexical categories introduced in this rule to co-occur. If this were true, it would be an extremely undesirable result; for example, if the elements Copula plus Adverb have been selected, not all items with the feature [+Copula] in the lexicon may be inserted in this position before all items with the feature [+Adverb] (está- can be inserted before bien but es cannot):

Está bien.

*Es bien.

However, the use of syntactic features in the pre-terminal string and in the lexical entry for each item which must match (as discussed in section 3.2) will prevent the insertion of an item into what would be an incorrect environment. For example, since the lexical entry for es has the feature [-___(+Manner)] and the entry for bien has the feature [+Manner], es cannot be inserted in the context discussed above.

The only alternative to this type of treatment would be to divide the lexical categories into smaller classes, dependent on the environments in which they could occur, and/or give context-sensitive rules to restrict their privileges of occurrence. This however would entail a significant complication of the base rules, which is unwarranted, since the use of syntactic features provides a relatively simple and straight-forward way to achieve the same result.

* [B-3] Aux ⟶ T⟨ha- + -do⟩⟨está- + -ndo⟩

B-3 states that the auxiliary consists of an obligatory tense/person marker which may optionally be followed by ha- + -do and/or está- + -ndo. Since at least T of the Aux must be present in every sentence, Aux in rule B-2 must be an obligatorily chosen element rather than an optional one. Clearly the elements for person and number are dependent on the choice of person and number elements in the subject NP. However, the development of Aux is irrelevant for the main problems discussed here; hence Aux has not been referred to in the subsequent comments, except with regard to the passive transformation, T-1).

The remainder of the elements in this rule allow for the generation of the compound verbal constructions usually called the perfect and the progressive:

ha cantado
está cantando
ha estado cantando

Even though they do not occur contiguously in an actual sentence, ha- and -do, as well as está- and -ndo always do occur simultaneously. That is, if ha- occurs, -do must occur also, though it will be found attached to an intervening verb stem of some sort. Thus, ha- and -do (and similarly, está- and -ndo) constitute discontinuous elements as they actually occur, but are more easily treated if they are considered to be single constituents. A later transformational rule (T-3) will take care of rearranging the affixes (-do and -ndo, as well as the tense/person marker T) so that they will follow the proper verb stem. The Aux elements provide a particularly striking example of a case where the simplest grammar will utilize underlying representations of forms which bear only an abstract and indirect relation to the forms that actually occur in the final derived surface structure.

* [*B-4*] $$\text{Pred} \longrightarrow \left\{ \begin{array}{l} \text{NP } \langle \text{Prep Phrase} \rangle \\ \langle \text{Adv} \rangle \{ \text{Adj } \langle \text{Prep Phrase} \rangle \} \end{array} \right\}$$

The element Predicate which was introduced following the Copula in the VP rule (B-2) is further developed in B-4. Either an adjective (Adj) or an NP must obligatorily be chosen. The NP may be optionally followed by a prepositional phrase (*un mapa* ⟨*del mundo*⟩) and the adjective can optionally be accompanied by a preceding adverb (⟨*demasiado*⟩ *lleno*), a following prepositional phrase (*lleno* ⟨*de papeles*⟩), or both (⟨*demasiado*⟩ *lleno* ⟨*de papeles*⟩).

It might appear that the rules B-2 and B-4 would permit any noun or adjective to occur after any copula. Clearly this would be an undesirable result since *está-* or *se-pone-* do not normally occur before nouns, and *se-hace-* does not ordinarily occur before adjectives. However, as mentioned with regard to B-2, the syntactic features specified in each lexical entry will prevent the insertion of an item in an incorrect environment. Although it is generally true that the lexical category Copula occurs before either adjectives or nouns, a copula like *está-* will have a feature $[-\underline{\quad\quad}\text{NP}]$ in its lexical entry which will, by the lexical convention discussed in section 3.2, prevent the insertion of *está-* in a string such as (NP Cop NP). Similarly, since only manner adverbials can occur immediately before the adjective in B-4, all other lexical entries with the features $[+\text{Adverb}, \left\{ \begin{array}{l} +\text{Loc} \\ +\text{Temp} \end{array} \right\}]$ will also have the feature [-___Adj].

Notice that since both *es* and *está-* in the lexicon have the feature [+___Adj], the grammar makes the claim that any adjective can occur after either copula. The different semantic interpretations of, e.g.,

Es enfermo. 'He's an invalid'
Está enfermo. 'He's sick'

are presumably accountable for by the semantic features associated with the lexical entry *enferm-* or by the rules which combine the semantic features of *enferm-* with those of *es* or *está-*. In the case of most adjectives, there will be only a very slight difference in meaning (often with the connotation of something funny or to be ridiculed):

Es católico. 'He's a Catholic (permanently)'
Está católico hoy. 'He's a Catholic (temporarily)'

* [*B-5*] Prep Phrase ⟶ Prep NP

The fifth base rule develops a prepositional phrase into a preposition plus a noun phrase (e.g., *pequeña de cuerpo*). It seems possible that nouns and adjectives may have features in their lexical entries which will indicate by what type of prepositional phrase they may be followed, so that each noun or adjective is allowed to occur only with certain types of prepositions.

* [*B-6*] Prep ⟶ de, sin, ...

In B-6 the category symbol Preposition is replaced by specific lexical items, i.e., prepositions. At this time it is not clear whether these items should also be given as entries in the lexicon with syntactic features, although this seems likely.

* [B-7] Adv $\longrightarrow$ +Adv, C.S.

B-7 is the first rule which involves the use of features and complex symbols. Following the general discussion of rules using feature specifications presented in section 2.4, rule B-7 does two things. First of all, B-7 states that Adverb is rewritten as the lexical category feature [+Adverb]. Second, it says that Adverb is strictly subcategorized with respect to the syntactic contexts (in terms of lexical category symbols) of the rule in which it was introduced (B-2 or B-4). That is, the lexical category symbol Adverb becomes a complex symbol (C.S.), i.e., a set of syntactic features. For example, if at this point in the rules we had generated the string (NP Cop Adv Adj), rule B-7 would replace Adverb by the feature [+Adverb] and would add to this the strict sub-categorization feature [+Cop___Adj]. As it turns out, there are lexical entries, e.g., demasiado, which have exactly the features [+Adverb, +Mann, +Cop___Adj] and since these entries are not distinct from the complex symbol [+Adverb, +Cop___Adj] found in the pre-terminal string, they can be substituted for this complex symbol.

* [B-8] [+Adv] $\longrightarrow \left\{\begin{array}{l} +\text{Mann} \\ +\text{Loc} \\ +\text{Temp} \end{array}\right\}$

B-8 is representative of several other base rules (B-9, 14-20) which have feature specifications on both sides of the arrow. These rules operate under the conventions for phonological rules and add the feature(s) on the right to the complex symbol which already has the feature specified on the left, instead of replacing one feature by another. B-8 states that a complex symbol with the feature [+Adverb] may add either the feature [+Mann], [+Loc] or [+Temp]. The complex symbol containing [+Loc] will eventually be replaced by the insertion of a locative adverb such as *aquí* [+Adverb, +Loc]; the complex symbol containing [+Temp] can be replaced later on by a temporal adverb from the lexicon such as *ahora* [+Adverb, +Temp].

* [B-9] [+Mann] $\longrightarrow \left\{\begin{matrix}\text{+Manner}\\ \text{por}^\frown\text{PASS}\end{matrix}\right\}$

Rule B-9 allows a complex symbol containing the feature [+Mann] to either add the feature [+Manner] or to be replaced by the element "por$^\frown$PASS". If the latter alternative is chosen and the complex symbol containing [+Adverb, +Mann, etc.] is replaced by the element "por$^\frown$PASS", a transformational rule (T-1) will eventually apply obligatorily to the string in which this element occurs, turning it into a passive sentence.

* [B-10] Copula $\longrightarrow$ +Cop, C.S.

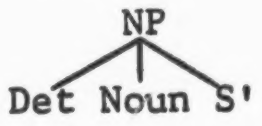
Rule B-10 operates much like B-7, the Adverb rule. First, the symbol Copula is replaced by the feature [+Copula]. Second, Copula becomes a complex symbol by adding to the feature [+Copula] strict sub-categorization features for the context in which Copula was first introduced in B-2. If at this point we have (NP Cop Adj), then by B-10 Copula in this string is replaced by the complex symbol [+Copula, +___Adj]. The lexical entry for *se-hace-* has the features [+Copula, ..., -___Adj], so it cannot be substituted for the complex symbol in question, i.e., we cannot have **Se hizo furioso*. However, *está-*, for example, has the features [+Copula, ..., +___Adj], so this Copula can be inserted in the position under consideration in our terminal string (which might eventually result in the acceptable *Está furioso*.).

* [*B-11*] Verb ⟶ +V, C.S.

B-11 does for the lexical category Verb what B-10 did for Copula. Verb is replaced by the feature [+Verb] and is strictly sub-categorized with respect to the contexts accompanying it in the rule where this category was originally introduced (B-2). Thus if we have a string (NP Verb NP), then Verb is replaced by the complex symbol [+Verb, +___NP] and a lexical entry such as *abre-* [+Verb, ..., +___NP] could be inserted in the string in place of the complex symbol, although an item like *duerme-* [+Verb, ..., -___NP] could not.

* [*B-12*] NP ⟶ ⟨Det⟩ Noun ⟨S'⟩

B-12 develops the noun phrase as either a noun, a noun followed by S', a determiner plus a noun, or determiner plus noun plus S'. Notice that this rule, as shown by a tree representation



makes the claim that the determiner, noun and S' are related equally to the noun phrase which introduces them. Since the S' introduced in an NP will usually serve for the embedding of nominal modifiers, it seems to be more reasonable to have these three elements be coordinate and of equal status than for the S' to be part of the noun (in which case the claim is made that it is more closely related to the noun than to the determiner) or determiner (in which case the claim is made that S' is more closely related to the determiner).

* [B-13] Noun ⟶ +N, $\begin{Bmatrix}1\\2\end{Bmatrix}$Number, C.S.

Rule B-13, which develops nouns, accomplishes three things. First, it replaces the lexical category symbol Noun by the feature [+Noun]. Second, it presents a choice between the features [1Number] and [2Number], one of which must obligatorily be chosen. Third, B-13 strictly subcategorizes nouns with regard to the four possible contexts in the rule (B-12) in which Noun was introduced. That is, Noun becomes a complex symbol consisting of the features [+Noun], [1 or 2Number], plus, depending on the choice of elements made in B-12, one of the following four strict sub-categorization features: [Det___S'], [___S'], [Det___], [___]. If we have generated a string such as (Det Noun VP), the Noun can be replaced by either the complex symbol [+Noun, 1Number, +Det___] or the complex symbol [+Noun, 2Number, +Det___]. In either case, a lexical entry such as mujer could replace these complex symbols (dependent upon the addition of correctly corresponding features in B-14 through B-20). In the second case, an agreement transformation and certain phonological rules will ultimately give this item its correct plural form as *mujeres*.

Notice that in the context "Det___" only the so-called "common" nouns occur, while in the context "___" only "proper" nouns occur. Thus instead of using [±Common] as an inherent feature of nouns, both in the pre-terminal string development and in the lexical entries for nouns in the lexicon, we can utilize the features [+Det___⟨S'⟩] for common nouns and [+___⟨S'⟩] for proper nouns.

It should also be observed that this rule, B-13, which develops the noun into a complex symbol makes the claim that number is an inherent feature of the noun which is obligatorily chosen (although a choice may be made between singular and plural number) during the generation of the pre-terminal string by the base rules. Thus the grammar here begins to provide a formal characterization for the traditional claim (and our intuitive feeling) that the subject noun in some way controls or governs the rest of the sentence. Here we see that number is selected independently with the noun, and later rules will show that, e.g., adjectives and verbs by means of transformational rules must "agree with" the subject noun in number (and also with regard to other elements).

* [*B-14*] [+N, +Det___⟨S'⟩] ⟶ [±Count]

B-14 says that a complex symbol [+Noun, +Det___⟨S'⟩]

in the pre-terminal string can have either the feature [+Count] or the feature [-Count] added to it. The feature [+Det___⟨S'⟩] is an abbreviation for the two features [+Det___] and [+Det___S'].

* [B-15] [+Count] ⟶ [±Animate]

B-15 adds the feature [+Animate] or [-Animate] to any complex symbol which contains the feature [+Count].

* [B-16] [+N, +___⟨S'⟩] ⟶ [±Animate]

In B-16 the features [+Animate] or [-Animate] are also added to any complex symbol which already has the features [+Noun, +___⟨S'⟩]. The feature [+___⟨S'⟩] is an abbreviation for the two features [+Det___] and [+Det___S'].

* [B-17] [+Animate] ⟶ [±Human]

B-17 adds the feature [+Human] or the feature [-Human] to a complex symbol which includes the feature [+Animate].

* [B-18] [+Det___⟨S'⟩, +Human] ⟶ [±Profession]

In B-18, a complex symbol of the pre-terminal string with the features [+Det___⟨S'⟩, +Human] has the feature [+Profession] or [-Profession] added to it.

* [B-19] [+Det___⟨S'⟩, -Animate] ⟶ [±Event]

Rule B-19 adds either the feature [+Event] or [-Event] to a complex symbol which already contains the features [+Det___⟨S'⟩, -Animate].

* [B-20] [-Count] ⟶ [±Abstract]

B-20 states that a complex symbol with the feature [-Count] can add either the feature [+Abstract] or the feature [-Abstract].

* [B-21] [+V] → C.S./[+N]...___⟨..[+N]⟩

Rule B-21 adds further syntactic features, but this time what are called selectional features, to the complex symbol which contains the feature [+Verb] (and which will already, by B-11, contain certain strict sub-categorization features, such as perhaps [+___NP]). This rule assigns or adds the syntactic features of the subject noun and object noun (if one is present) to the complex symbol which the verb has become (by means of B-11). Thus if we have a string such as

Det [+Noun,..., +Animate] [+Verb, +___NP] Det
[+Noun,..., -Animate]

the complex symbol containing the feature [+Verb] can be expanded by B-21 to [+Verb, +___NP, +(+Animate)___, +___(-Animate)]. Lexical entries such as *admira-* [+Verb, ..., +(+Animate)___] could be inserted for this complex symbol, but items such as *asusta-* [+Verb,..., +___(+Animate)] could not:

La mujer admira la sinceridad.
*La mujer asusta la sinceridad.

Of course this rule implicitly makes the claim that the type of inherent features possessed by the subject and object nouns in a sentence are relevant to the selection of the verb which occurs in that sentence. That is, once we have selected a subject noun such as *el libro*, which has the feature [-Animate], it cannot be followed by the verb *ama-*, which requires an animate subject. Similarly, if we have chosen the same noun as the object, it cannot be preceded by a verb such as asusta-, which requires an animate object.

* [B-22] [+Cop] → C.S./[+N]...___

Rule B-22, which works in the same fashion as B-21, adds features of the subject noun to the complex symbol that contains the feature [+Copula] (and which will also, by B-10, already have certain strict sub-categorization features associated with it).

* [B-23] Adj → +Adj, C.S./[+N]...___

B-23 accomplishes two things. First, it replaces the category symbol Adjective by the feature [+Adjective] and second, it assigns selectional features of the subject noun (i.e., adds syntactic features of this noun) to the complex symbol that contains the feature [+Adjective]. Therefore this rule also makes the claim that subject nouns govern the other elements in a sentence, by indicating that choice of an adjective is dependent on the type of subject noun present; that is, if a sentence contains the subject noun el libro [-Animate], the adjective guap- [+Adjective,..., +(+Animate)___] could not be utilized in this sentence.

* [B-24] Det → $\left\{\begin{array}{l}\text{Article}\\ \text{Demonstrative}\\ \ldots\end{array}\right\}$

It is likely that rule B-24, which says a determiner can be either an article or a demonstrative, will include other classes of items. For example, the so-called "limiting adjectives" (which are not treated at all in this study) may very probably be introduced here. In that case B-24 might have a form somewhat like this:

$$\text{Det} \rightarrow \left\{\begin{matrix}\text{Article} & \\ & \langle\text{Limiting}\rangle \\ \text{Demonstrative} & \end{matrix}\right\}$$

What is clear is that the "limiting adjectives" will not be introduced in the VP rule as part of Adjective, since for one reason, they do not occur following a noun phrase plus a copula (unless they occur there as the result of a transformation of some sort). We cannot have sentences such as:

$$\text{*El hombre es} \left\{\begin{matrix}\text{todo}\\ \text{otro}\\ \text{tanto}\\ \text{cada}\end{matrix}\right\}$$

Notice that a rule such as the suggested one above which introduces "limiting adjectives" as part of the determiner makes the claim, implicitly, that these items are in fact determiners and not adjectives, since they will be traceable back to the node Determiner, but never to the node Adjective.

It is likely that possessives at least will not be introduced by the Determiner rule, but rather by a transformation which would operate on a string such as

El libro de él

and change it, simultaneously introducing the possessive, to

Su libro

* [B-25] Article $\longrightarrow$ +Art

B-25 states that Article is rewritten as the lexical category feature [+Article]. Ultimately, in accordance with the lexical convention described in section 3.2, either -l- [+Article, +Definite] or un- [+Article, -Definite] can be inserted in a pre-terminal string in place of this lexical category feature.

3.2 Lexicon

The lexicon, which is the other part of the base of the syntactic component, is a list of lexical entries. Each entry consists of a set of phonological, syntactic and semantic features. In this study, each entry is given in a more or less conventional orthographic form rather than in the phonological distinctive features form that lexical entries would ordinarily have. Further, since this study deals primarily with syntactic problems, semantic features have been omitted entirely. The lexical items do not need to be ordered in any particular fashion, but they are arbitrarily listed alphabetically in the lexicon of Appendix 1.

Each entry in the lexicon will be positively specified (+) for the lexical category to which it belongs. Other than the lexical category features, the features specified in the lexical entries will be of two general types (as discussed in section 2.4). First, there will be the inherent features, which are peculiar to the item in question and have nothing to do with the context in which the item can occur. For example, there are the features [±Loc], [±Temp], [±Mann] for adverbs; [±Definite] for articles; [±Apocope] for adjectives and articles; $[\left\{\begin{matrix}1\\2\end{matrix}\right\}$ Gender], [±Human], [±Count], etc. for nouns. In addition $[\left\{\begin{matrix}1\\2\end{matrix}\right\}$MC] is an inherent feature (introduced only in the lexicon) which occurs in the lexical entries for nouns, adjectives and articles.

There will also be contextual features specified in the lexical entries. These may be strict sub-categorization features, such as [+___NP] for verbs and [+Det___] for nouns, which indicate contexts, in terms of category symbols, in which a given lexical item can occur. Contextual features may also be selectional features, such as [+(+Animate)___] for verbs or adjectives, which indicate other contexts in which a given lexical item can occur, in terms of a significant feature of another lexical item, namely the subject noun.

Some entries may have two specifications with regard to lexical categories. That is, the items which share the characteristics of both nouns and adjectives, such as *viej-*, will have the features [+Noun] and [+Adjective]. This means that, provided the rest of the features in the lexical entry for *viej-* are not distinct from those in the position under consideration in the pre-terminal string, this lexical item can be inserted into the string wherever a [+Noun] or a [+Adjective] occurs in the string.

A feature specification in a lexical entry which involves the use of braces $(\{\ \})$ indicates that a choice must be made between the elements enclosed in these braces. For example, the noun herman- has the feature $[\left\{\begin{matrix}1\\2\end{matrix}\right\}\text{Gender}]$ and this requires one to choose either [1Gender] or [2Gender] if this item is inserted in a pre-terminal string. Herman- with [1Gender] will ultimately result in hermano after the application of the phonological rules, and with [2Gender] will result in hermana.

Similarly, a specification such as $[\left\{\begin{matrix}\text{1Gender, 2MC}\\\text{2Gender, 1MC}\end{matrix}\right\}]$, which occurs in the lexical entry for español-, means that either the combination [1Gender, 2MC] (which ultimately gives español) or the combination [2Gender, 1MC] [which results in española) must be chosen.

The lexicon will also include certain redundancy rules which simplify lexical entries by adding syntactic features to them which are predictable by general rule. That is, the features specified in the lexicon for a particular lexical entry will only be those which are essentially peculiar to that entry. However, the redundancy rules are not given in the sample lexicon presented in the grammar of Appendix 1. Thus, most entries will list several syntactic features which are predictable by general rule because their inclusion hopefully makes the workings of the grammar simpler to follow. The only exception to this policy concerns the features for category symbols. Each lexical entry will be positively specified for one category symbol (e.g., [+Noun]), or perhaps two, as in the case of *viej-*, (e.g., [+Noun, +Adjective]), and will be specified negatively for all the others (e.g., [-Verb, -Adverb, -Article, ... etc.]). Instead of including all the necessary negative category features for each lexical entry, we will assume that a redundancy rule of the lexicon provides a negative category feature for all categories for which the entry in question does not have a plus.

Actually, since the items which belong to a particular lexical category all have some features that are unique to that category, it is even possible to omit category features entirely from the lexical entries. For example, any item with [±Loc, ±Temp, ±Manner] has to be an adverb and could automatically be assigned the category feature [+Adverb]. Similarly, any item with [±Definite] also has predictably the feature [+Article], and any items with [±Det___⟨S'⟩, ±Count, ±Animate, ±Human, ±Profession, ±Abstract, ±Event] will have the category feature [+Noun].

Following are a few redundancy rules which might be desirable in a lexicon of the sort presented in this study (the arrow indicates that features on the right are added to those on the left):

1) [+Manner] ⟶ [+___Adj]

Any lexical entry with the feature [+Manner] has the feature [+___Adj] added to it, since any manner adverbial can occur in the position preceding an adjective.

$$2)\ \left\{\begin{matrix}[+\text{Temp}]\\ [+\text{Loc}\ ]\end{matrix}\right\} \longrightarrow [-\_\_\_\text{Adj}]$$

All temporal and locative adverbs have the feature [-___Adj] added to their lexical entries since none of these adverbs can occur preceding an adjective.

3) [±Profession] ⟶ [+Human]

Any item with the feature [+Profession] or [-Profession] will have the feature [+Human] added to its lexical entry because all nouns which have a specification for the feature 'profession' are human nouns.

4) [±Human] ⟶ [+Animate]

5) [±Event] ⟶ [-Animate]

6) [±Abstract] ⟶ [-Count]

7) [±Count] ⟶ [+Det___⟨S'⟩]

Redundancy rules such as 3) through 7) would allow us to reduce the syntactic features specified in the lexical entry for e.g., abogado from [+Noun, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, +Profession] to [+Noun, -___⟨S'⟩, +Count, +Profession], as the three features deleted can be predicted on the basis of the presence of the remaining four.

8) [±Motion] ⟶ [-___NP]

Any item with a feature specification for 'motion', and these will only be intransitive verbs, has the feature [-___NP] added to its lexical entry, since no intransitive verb of motion can occur before an object NP.

9) [±Object delete] ⟶ [+___NP]

All items with a feature specification for 'object deletion' are necessarily transitive verbs and these items occur before an NP object, so the feature [+___NP] can be added to the lexical entries for these items.

10) $[\alpha\_\_\_NP] \longrightarrow [-\alpha\_\_\_]$

This redundancy rule states that an item with a feature specification regarding its occurrence before an NP has a feature with the opposite value added for its occurrence with nothing following it. For example:

camina- $[+Verb, \ldots, -\_\_\_NP] \longrightarrow [+Verb, \ldots, -\_\_\_NP, +\_\_\_]$

11) $[\alpha Det\_\_\_\langle S' \rangle] \longrightarrow [-\alpha\_\_\_\langle S' \rangle]$

Similarly, all items with a feature specification with respect to their occurrence after a determiner add a feature with the opposite value for their occurrence without a preceding determiner. For instance:

hombre $[+Noun, \ldots, +Det\_\_\_\langle S' \rangle] \longrightarrow [+Noun, \ldots, +Det\_\_\_\langle S' \rangle, -\_\_\_\langle S' \rangle]$

The pre-terminal string generated by the rewriting rules of the base becomes a terminal string when lexical entries are inserted by means of a lexical convention (itself part of linguistic theory) which can be formulated something like the following:

> If Q is a complex symbol of a pre-terminal string and there is a lexical entry with a collection of syntactic features C, where C is not distinct from Q, then the lexical entry under consideration can replace Q.

Distinctness here means that the same features found in a pre-terminal string and in a lexical entry must have opposite values, not just that one place may have a feature specification which the other lacks. This convention says, for example, that if we have the complex symbol [+Noun, 1Number, +Det___⟨S'⟩, +Count, -Animate, -Event] in a pre-terminal string, the lexical entry *libro*, with the features [+Noun, +Det___⟨S'⟩, -___⟨S'⟩, +Count, -Animate, -Event, 1Gender, 2MC], may be inserted in place of it. The complex symbol in the pre-terminal string and the lexical entry each have features the other lacks, but there are no features held in common by both for which they have opposing values. If, for example, we consider the lexical entry *sinceridad* which has the features [+Noun, +Det___⟨S'⟩, -___⟨S'⟩, -Count, +Abstract, 2Gender, 2MC] we find that the lexical convention prevents the insertion of this item in the place under consideration in the pre-terminal string, since the latter has the feature [+Count] while *sinceridad* has the feature [-Count].

The entire question of derivational processes has been generally ignored in this study, but it is perhaps worthwhile mentioning briefly at this point. It is clear that we do not want separate lexical entries for the adjective *sincer-* (which becomes *sincero* or *sincera* later in the rules) and the noun *sinceridad*, since both their phonological shapes and their semantic interpretations are closely related. Rather, the adjective form will have a feature specification in the lexicon that will determine the phonetic form it will assume after undergoing a nominalization transformation (roughly, something like

El hombre es sincero ⟹ La sinceridad del hombre...)

The proper form of such rules remains to be made explicit.

3.3 Transformational Rules

The transformational sub-component of the syntactic component consists of a sequence of transformational rules which serve to convert the deep structures generated by the base rules into surface structures (which will be given a phonetic interpretation by the phonological component). The rules apply to certain defined structures with lexical items in them and may even refer to specific syntactic features of these lexical items, and produce such changes as introducing new elements, deletions, permutations, addition and changes of syntactic features. The sequence of transformational rules will apply cyclically to generalized phrase-markers produced by the rules of the base: first to the most deeply embedded phrase-marker dominated by S and so on until the full set of rules applies to the entire configuration dominated by the initial S which began the derivation. If enough rules apply so that all the necessary embeddings are effected, a "well-formed" surface structure results and the generalized phrase-marker with which we started does in fact constitute the deep structure of the sentence which results after the application of all the rules of the grammar. For instance, if the base rules generate

D N V [D N Cop Adj]
El hombre llega [El hombre está contento]

a transformation (T-12) can apply to this generalized phrase-marker to produce

D N V Adj
El hombre llega contento.

In this case we have a "well-formed" surface structure for which the above generalized phrase-marker constitutes the deep structure (see section 2.2).

In the case of a generalized phrase-marker for which there have not been applicable transformations to effect all the necessary embeddings, we have a generalized phrase-marker which did not constitute the deep structure of some sentence. That is, if the base rules provide the following generalized phrase-marker

D N V [D N Cop Adv]
El hombre llega [El hombre está aquí]

there will be no transformational rules which are specified to operate on such a structure. Thus, in this instance, since no embeddings ever take place, a "well-formed" surface structure cannot result and the generalized phrase-marker in question is not the deep structure of any sentence.

* [T-1] PASSIVE - OBLIG.

Description: NP_1 Aux V NP_2 por⌢PASS
1 2 3 4 5 6

Structural Change: $\underbrace{1\ 2}$ 3 4 5 6 $\Longrightarrow$ 4 2 ser + -d- 3 5 1

The first rule of the transformational sub-component applies obligatorily to any terminal string which contains the marker "por⁀PASS", which could have been optionally chosen during the operation of the base rules. The effect of the rule is to move the object NP into the subject position, assign the original subject NP to a position after *por* as the agent, and to insert the copula *ser* plus the affix *-d-* immediately before the verb. For example:

La bomba Aux ataca- el avión por PASS $\Longrightarrow$

El avión Aux ser + -d- ataca- por la bomba

As was discussed with regard to B-3 and as will be further commented on with regard to T-3, *ser* plus *-d-*, since they always occur simultaneously in a passive sentence though not contiguously, are much more easily introduced as continuous elements. Subsequently, T-3, the affix shift rule, will operate to place Aux after *ser*, in order to give this copula its correct tense (and person). T-3 will also permute the *-d-* affix to a position after the verb. For example, if we allow Aux in this case to contain an element for past tense:

El avión $\underbrace{\text{Aux}}$ ser + -d- ataca- por la bomba

El avión $\underbrace{\text{Past + Singular}}$ ser + -d- ataca- por la bomba

$\xrightarrow{\text{T-3}}$ El avión fue atacad- por la bomba

Finally the agreement transformation T-4 applies to the verb plus *-d-* forms which have resulted from the operations of the passive and affix shift transformations in order to cause them to "agree with" the new subject noun. Since the affix shift and agreement rules must apply to part of the output of T-1 and since the forms which result from the application of these three rules must be operated on by several later transformations (e.g., T-7, 10, 11), the passive rule must be ordered very early in the grammar.

Notice that this rule says that what are traditionally called past participles have two different origins (in the case of transitive verbs). The base rules can generate: (ha- + *-do* *Verb*), which after T-3 will become (ha- *Verb* + *-do*). This will be true for either transitive or intransitive verbs. The passive transformation introduces the elements (ser + *-d-* *Verb*), which after T-3 will become (ser *Verb* + *-d-*). Naturally, this occurs only for transitive verbs. This unit will subsequently be operated on by the agreement transformation T-4 and assigned the gender and number features of the subject noun, so that rules of the phonological component can apply to add a vowel and possibly a plural *s*, giving as the result: (ser Verb + -d-$\left\{\begin{matrix}o\\a\end{matrix}\right\}\langle s\rangle$). Thus in

El hombre ha *cantado* día y noche.

and in

El himno fue *cantado* por la gente.

although the two forms underlined appear to be identical from the point of view of the surface structure, in terms of their derivational history these two forms are different.

It should be mentioned that one motivation for deriving the "por$^\frown$PASS" element from a manner adverbial in the base rules, rather than just allowing the passive transformation to apply to any string which contained a verb with an object NP, is that there are verbs (usually labelled "middle verbs") which take objects but do not allow passivization. These same verbs do not occur with a manner adverbial either, so the passive transformation is properly restricted only if it can apply just to the strings which allow both NP objects and a manner adverbial. For example:

 Tiene unos libros.
*Tiene unos libros constantemente.
*Dos libros fueron tenidos ⟨por NP⟩.

but

Quiebra los huevos.
Quiebra los huevos constantemente.
Dos huevos fueron quebrados ⟨por NP⟩.

* [T-2] AGENT DELETION - OPT.

Description: $\underset{1}{NP_2}\ \underset{2}{Aux}\ \underbrace{ser + \text{-d-}}_{3}\ \underset{4}{V}\ \underbrace{por\ NP_1}_{5}$

Structural Change: $1\ 2\ 3\ 4\ 5 \Longrightarrow 1\ 2\ 3\ 4$

Since T-2 operates on the result of the passive transformation (T-1) to optionally delete the agent (por NP_1), it must be ordered after T-1. By this rule a string such as:

El avión fue atacado por la bomba.

may become

El avión fue atacado.

* [T-3] AFFIX SHIFT - OBLIG.

Description: Affix Stem
1 2

Condition: Affix = -d-, -do, -ndo, T

Stem = V, se-V, Cop, ha-, está-

Structural Change: 1 2 ⟹ 2 1

As mentioned with regard to the rule for Aux (B-3), it is much simpler to treat such elements as ha- plus -do and está- plus -ndo as contiguous at the level of the base rules. T-3 is then required to obligatorily rearrange the elements introduced by the Aux rule so that all the affix elements (-do, -ndo, T) will be permuted with whatever elements immediately follow them. Omitting the exact operations involved for T, we might have the following:

ha- + -do + canta- ⟹ ha cantado
está- + -ndo + canta- ⟹ está cantando
ha- + -do + está- + -ndo + canta- ⟹ ha estado cantando

T-3 must be ordered after the passive transformation (T-1) in order to apply to the elements -d- and Verb which result from this rule.

* [T-4] ADJECTIVE (AND PAST PARTICIPLE) AGREEMENT - OBLIG.

$$\left\{\begin{matrix}[+\text{Adj}]\\ \text{V-d}\end{matrix}\right\} \Longrightarrow \begin{bmatrix}\alpha\,\text{Gender}\\ \beta\,\text{Number}\end{bmatrix} \Big/ \begin{bmatrix}+\text{N}\\ \alpha\,\text{Gender}\\ \beta\,\text{Number}\end{bmatrix} \ldots \underline{\quad},$$

where N Cop Adj is an S
V-d por NP

The agreement rules (T-4, 5, 6) are fairly early transformations. They must apply before any embeddings take place so that agreement will be made with the subject NP of the underlying strings (as will be discussed with regard to T-12. Thus we have:

El amigo de mis padres canta.

not

*El amigo de mis padres cantan.

However, at least T-4, the adjective agreement rule, must apply after the passive transformation since all (Verb + *-d-*) forms generated by T-4 must also agree in gender and number with the new subject noun in a sentence in which they occur. Notice, however, that this rule (T-4) applies only to past participles (Verb + *-d-* forms) generated as a result of the passive transformation, and not to those past participles (Verb + *-do* forms) introduced by the operation of the Aux (B-3) rule.

T-4, which operates much like assimilation rules of the phonological component, states that within a sentence the noun's features of gender and number (whatever their values) are added to the set of features which includes the feature [+Adjective] (or to the form Verb + *-d-*). In this way the grammar provides a formalization of the traditional notion that a predicate adjective in a sentence agrees with the subject. Notice that the environment specified in this rule is necessary so that T-4 will not apply to cause an adjective to "agree with" a noun dominated by a different S.

Thus if we have the noun *libro* with the features [+Noun, ... 1Gender, 1Number, 2MC] and the adjective *buen-* with the features [+Adjective, ..., 1MC] inserted into a string, by T-4 the latter complex symbol will become [+Adjective, ..., 1Gender, 1Number, 1MC]. Rule PH-2 of the phonological component will eventually operate to add an *o* to *buen-*, giving *bueno*.

* [*T-5*] *ARTICLE AGREEMENT* - OBLIG.

$$[+\text{Art}] \Longrightarrow \begin{bmatrix}\alpha\text{Gender}\\ \beta\text{ Number}\end{bmatrix} \Big/ \;\text{---}\; \begin{bmatrix}+\text{N}\\ \alpha\text{Gender}\\ \beta\text{ Number}\end{bmatrix}$$

T-5 actually accomplishes with respect to the article, the same thing as T-4 accomplishes with respect to the adjective. However, the article agreement rule must be stated separately since it operates on a complex symbol in a different position, i.e., immediately before a noun. Again the features of gender and number belonging to the set of features which includes [+Noun] are assigned to the set of features which includes [+Article]. Later phonological rules operate to convert these complex symbols into the correct phonological shapes. Notice that for the article rule it is not necessary to mention that (Article + Noun) must be an NP, since at this point in the rules the only place an article can immediately precede a noun is just in an NP.

* [T-6] VERB AGREEMENT - OBLIG.

$$[+V] \Longrightarrow [\alpha\text{Number}] \Big/ \begin{bmatrix} +N \\ \alpha\text{Number} \end{bmatrix} \;\underline{\quad}\; \ldots, \quad \text{where } \langle D \rangle\, N\ V \ldots \text{ is an } \underline{S}$$

The sixth transformational rule provides for the agreement of the verb with its subject noun, in number. The noun's feature specification for number is also added to the verb's set of features:

$$\text{hombre}_{[+N,\ldots,\ 2\text{No.}]} \cdots \underline{\text{come}}\text{-}_{[+V,\ldots]} \Longrightarrow$$

$$\text{hombre}_{[+N,\ldots,\ 2\text{No.}]} \cdots \underline{\text{come}}\text{-}_{[+V,\ldots,\ 2\text{No.}]}$$

The phonological rule PH-6 will ultimately add a final n to those verbs which have acquired the feature [2Number].

PH-6 $\text{hombre}_{[2\text{Number}]}$ ... comen

PH-7 hombres ... comen

* [T-7] RELATIVIZATION - OBLIG.

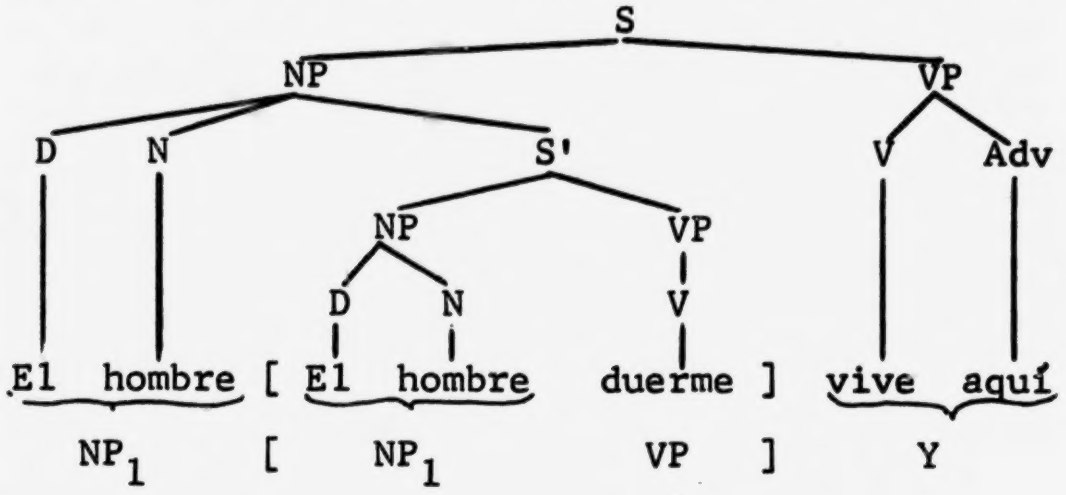
Description: $\begin{array}{ccccc} X & NP_1 & [NP_1 & VP] & Y \\ 1 & 2 & 3 & 4 & 5 \end{array}$

Condition: 2 = 3

Structural Change: 1 2 3 4 5 $\Longrightarrow$ 1 2 que 4 5

The relativization rule, T-7, is the first of the transformations which effect embedding. This rule serves to embed a lower phrase-marker into an immediately higher one, by introducing the relative que in place of a repeated NP. Notice that this transformation is restricted to operating only where a generalized phrase-marker of the type specified in the structural description has identical NP's, and it must obligatorily operate on any generalized phrase-markers which match this description.

Thus if we had a string (omitting details) such as:



T-7 would operate to give:

El hombre que duerme vive aquí.

This transformation needs to be ordered after the passive rule so that it can operate on strings which have already undergone that rule:

El hombre ve el muchacho [El muchacho fue atacado por el perro] $\Longrightarrow$ El hombre ve el muchacho que fue atacado por el perro.

* [T-8] NOUN DELETION IN RELATIVE - OPT.

Description: X $\text{Art}_{[+\text{Def}]}$ N que VP Y
1 2 3 4 5 6

Structural Change: 1 2 3 4 5 6 $\Longrightarrow$ 1 2 4 5 6

T-8 applies to the output of the relativization rule (T-7) to optionally delete the subject noun, following a definite article. Therefore this rule must follow T-7 and must be ordered after the agreement transformations so that the article, the verb and any adjective that may be present already agree with this noun. Only after agreement has been effected can the noun be deleted by T-8. A string such as:

La muchacha que es buena vive aquí.

can become:

La que es buena vive aquí.

* [T-9] NUMBER PLUS NOUN OR ADJECTIVE - OPT.

$$\text{Description: } \begin{array}{cccccc} X & \text{No.} & \text{que} & \text{Cop} & \left\{\begin{array}{c} \text{Adj} \\ 5 \\ \text{D} \;\; \text{N} \end{array}\right\} & Y \\ 1 & 2 & 3 & 4 & 6 \;\; 7 & 8 \end{array}$$

$$\text{Structural Change: } 1\ 2\ 3\ 4 \left\{\begin{array}{c} 5 \\ 6 \;\; 7 \end{array}\right\} 8 \Longrightarrow 1\ 2 \left\{\begin{array}{c} 5 \\ 7 \end{array}\right\} 8$$

The ninth transformational rule applies to strings of a type which will not be generated by the base rules of the grammar as they now are formulated. T-9 however is included as it allows for the generation of such sentences as:

Tengo dos hermanos, uno abogado y uno dentista.

Aquí hay dos libros: uno bueno y otro malo.

Given a construction of the type specified in the structural description, T-9 applies to leave a number followed by a noun or adjective form.

It seems likely that numbers are in a class with "limiting adjectives" and might perhaps be generated in a position between the determiner and the noun of the NP:

Rules	String generated
NP ⟶ Det Noun	Det Noun

$$\text{Det} \longrightarrow \left\{\begin{matrix}\text{Art} & \\ & \langle\text{Limiting}\rangle \\ \text{Demons} & \end{matrix}\right\} \qquad \text{Art Limiting Noun}$$

$$\text{Limiting} \longrightarrow \left\{\begin{matrix}\text{Number} \\ \vdots\end{matrix}\right\} \qquad \text{Art Number Noun}$$

Certain optional transformations could operate on this type of noun phrase (Art Number Noun) after the agreement rules:

1) $T_{\text{article delete}}$ - OPT.

$$\begin{array}{lllcll} \text{Art} & \text{Number} & \text{Noun} & \Longrightarrow & \text{Number} & \text{Noun} \\ \text{los} & \text{dos} & \text{hermanos} & & \text{dos} & \text{hermanos} \end{array}$$

2) $T_{\text{noun delete}}$ - OPT.

$$\begin{array}{lllcll} \text{Art} & \text{Number} & \text{Noun} & \Longrightarrow & \text{Art} & \text{Number} \\ \text{los} & \text{dos} & \text{hermanos} & & \text{los} & \text{dos} \end{array}$$

In the event that both of these suggested transformational rules have operated on an NP which had been expanded as (Art Number Noun), we would be left with: (Number). Now, following the relativization rule T-9 will operate on a string which has a subject NP that has already gone through the above development:

Uno que es bueno vive aquí $\Longrightarrow$ Uno bueno vive aquí.

* [T-10] PAST PARTICIPLES AS ADJECTIVES - OBLIG.

$$\text{Description: } \begin{array}{cccccccc} \text{X} & \text{NP}_2 & \text{Cop} & [\text{NP}_2 & \text{ser} & \text{V-dv}\langle\text{s}\rangle & \langle\text{por NP}_1\rangle\ ] & \text{Y} \\ 1 & 2 & 3 & 4 & 5 & \underbrace{\quad 6 \quad} & \underbrace{\quad 7 \quad} & 8 \end{array}$$

Condition: 2 = 4

Structural Change: 1 2 3 4 5 6 7 8 $\Longrightarrow$ 1 2 3 6 7 8

The rule T-10 operates on a generalized phrase-marker to embed a string (to which the passive transformation, affix shift and agreement rules have already applied) into a second string, after a copula. The subject NP's in the two strings must be identical and the effect of T-10 is to place the so-called "past participle" (optionally accompanied by the agent) of the passive sentence in the position after the copula in which an adjective usually occurs. In addition, the repeated NP is deleted. Thus from:

Las chicas están [Las chicas son invitadas ⟨por NP⟩]

we get by T-10:

Las chicas están invitadas ⟨por NP⟩.

In effect this transformation claims that the "past participle" forms generated by the passive rule (plus the affix shift and agreement rules) can become (i.e. function as) adjectives. From now on in the grammar, any rules that apply to adjectives will also apply to these forms.

Once the derivational history of the "past participle" forms that are found after a copula is known, it is clear why only the "past participles" of transitive verbs occur in this position. Only transitive verbs can go through the passive transformation and due to T-10 only "past participles" generated by means of the passive rule will ever be introduced into the position following the copula. "Past participles" of intransitive and middle verbs will be generated, in conjunction with the Aux rule, in the base rules of the grammar but can never be affected by T-10 and thus will never "become adjectives" at any stage in the grammar and agree with their subject nouns. That is, there are constructions such as:

Las muchachas cansadas...(Verb transitive)

but not:

*Las muchachas idas...(Verb intransitive)

*Las muchachas tenidas...(Verb middle)

* [T-11] ADVERB DROPS -mente - OPT.

Description: $\underset{1}{\text{NP}}\ \underset{2}{\text{V}}\ \underset{3}{\langle\text{NP}\rangle}\ [\underset{4}{\text{+Mann}}\ (\underset{5}{\text{Adj}} - \underset{6}{\text{mente}})]$

Condition: $5 = \begin{Bmatrix} \text{+Adj} \\ \text{V-dv}\langle\text{s}\rangle \end{Bmatrix}$

Structural Change: $1\ 2\ 3\ 4\ 5\ 6 \Longrightarrow 1\ 2\ 3\ 5_{[+\ \text{1Gender}]}$

Although they are never generated by the base rules, there are two types of constructions which involve the occurrence of an adjective after a verb. [See Stockwell, Bowen, and Martin, 1965, pp. 184, 201; Kahane and Pietrangeli, 1954, pp. 98-9.] In the first case (which is handled by T-11) a masculine singular adjective appears, regardless of the gender and number of the subject NP:

Caminamos lento.

In the second case (which is covered under T-12) an adjective occurs which does agree with the subject NP:

Los monjes caminan lentos.

T-11 states that a manner adverbial formed from an adjective plus the suffix -mente (a derivational process which will probably be handled in the lexicon by assigning to certain adjectives the feature [+___mente]) can optionally drop this suffix. In the process, the feature [1Gender] is assigned to the adjective so that the phonological rules will eventually add an o to those adjective forms which end in o in the masculine (or nothing to those adjectives which do not have an o ending for the masculine). The result is thus a masculine singular adjective form occurring after a verb. Since the adjective form in the result of T-11 always occurs as a masculine singular and never agrees with the subject noun, T-11 can follow the agreement rules. For example:

Caminamoa lentamente. ⟹ Caminamos lento.

Estos asuntos los arreglan fácilmente. ⟹ Estos asuntos los arreglan fácil.

Los hombres comen tranquilamente. ⟹ Los hombres comen tranquilo.

The noun phrase in the structural description is given as optional so that this rule could apply to either a string containing a transitive or middle verb followed by an NP or to a string containing an intransitive verb with no NP object.

It appears furthermore that some speakers have this rule while others do not, but for those who do, this rule must be ordered after T-10 so that it will also operate on any adverbs in -mente which have been formed from past participles (which have become adjectives by T-10) plus -mente. It is likely that the adjectives which are marked to form adverbs with the suffix _-mente_, must also be marked as to whether the _-mente_ is then optionally deletable (i.e., whether T-11 can apply), since apparently not all adjectives can drop _-mente_:

Quiero que hagas eso voluntariamente.

*Quiero que hagas eso voluntario.

and some that can drop it must insert a preposition:

Se transformó completamente.

*Se transformó completo.

Se transformó por completo.

* [T-12] VERB PLUS ADJECTIVE - OBLIG.

Description: $\underset{1}{NP_1}\ \underset{2}{V_{[+Motion]}}\ [\underset{3}{NP_1}\ \underset{4}{Cop}\ \underset{5}{Adj}]$

Condition: 1 = 3

Structural Change: $1\ 2\ 3\ 4\ 5 \Longrightarrow 1\ 2\ 5$

The second type of construction involving the occurrence of an adjective after a verb is handled by T-12. This rule, which operates on a generalized phrase-marker, embeds a lower phrase-marker containing a sequence (NP Cop Adj) into another phrase-marker following an intransitive verb of motion, deleting all but the adjective of the lower phrase-marker, provided the NP's of the two phrase-markers are identical. For example:

La muchacha se fue [La muchacha está contenta] $\Longrightarrow$

La muchacha se fue contenta.

Since T-4, the agreement transformation, applies only to adjectives after a copula, this rule must operate on the lower string before embedding occurs. Once embedding takes place, the copula is deleted and the agreement rule no longer operates. Furthermore since the past participle forms generated by T-1 which become adjectives in T-10 can also be operated on by T-12, the latter rule must be ordered after T-10 as well as after T-1 and T-4. For example:

Ellos llegaron [Ellos están cansados] ⟹
Ellos llegaron cansados.

T-12 is specified as applying to intransitive verbs of motion but in actual fact not all the members of the class of verbs involved signify motion. However this label has been used to designate the group for purposes of this discussion. Such verbs as sonreír and vivir are included in this class:

Los muchachos sonríen contentos.
María vive tranquila.

T-12 will not apply to transitive verbs, as there is no object NP specified in the structural description for this transformation, nor will it apply to any intransitive verb which has the feature [-Motion]:

Ellos $\text{murieron}_{[+\text{Verb},\ldots,\ -\text{Motion}]}$ [Ellos son lentos]
⇏ *Ellos murieron lentos.

Notice that intransitive verbs with the feature [+Motion] can conceivably be followed by three related forms:

Los monjes caminan lentamente.

Los monjes caminan lento. [T-11]

Los monjes caminan lentos. [T-12]

* [T-13] APPOSITION - OPT.

Description: $\underset{1}{X}\ \underset{2}{NP_1}\ \underset{3}{que}\ \underset{4}{Cop}\ \underset{5}{NP_2}\ \underset{6}{Y}$

Structural Change: 1 2 3 4 5 6 $\Longrightarrow$ 1 2, 5, 6

The apposition rule operates optionally on one of the possible outputs of T-7, the relativization transformation. Its effect is to place a predicate nominal immediately after the subject noun of a sentence. For example:

Este hombre que es el rey es muy famoso $\Longrightarrow$

Este hombre, el rey, es muy famoso.

* [T-14] ARTICLE DELETION WITH APPOSITION - OPT.

Description: $\underset{1}{X}\ \underset{2}{NP_1},\ \underset{3}{D}\ \underset{4}{N}\ \underset{5}{W},\ \underset{6}{Y}$

Structural Change: 1 2 3 4 5 6 $\Longrightarrow$ 1 2 4 5 6

T-14 operates on the output of the apposition rule and therefore must follow T-13. It serves to delete the article of the second NP. By including the symbol 'W' in the structural description for this rule, it can apply to the noun in a new complex NP such as:

Valparaíso, el puerto principal, ...

which can become:

Valparaíso, puerto principal, ...

or,

Tengo un hermano, un médico en Madrid, ...

which can become:

Tengo un hermano, médico en Madrid...

* [T-15] ARTICLE DELETION IN PREDICATE NOMINAL - OPT.

Description: $\begin{array}{cccccccc} X & D & N & \langle que \rangle & Cop & D & N & Y \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$

Condition: $8 = \begin{Bmatrix} VP \\ \emptyset \end{Bmatrix}$

Structural Change: $1\ 2\ 3\ 4\ 5\ 6\ 7\ 8 \Longrightarrow 1\ 2\ 3\ 4\ 5\ 7\ 8$

T-15 optionally deletes an article before a noun in the predicate following a copula. Thus:

Estos libros son unos diccionarios. ⟹

Estos libros son diccionarios.

Since this rule can operate on a string which has gone through the relativization transformation, as well as on a string which has not been affected by that rule, the element que must be included optionally in the description, and T-15 must be ordered after T-7. Furthermore, the rule does not apply if an adjective follows the predicate noun. Thus:

Mi hermano que es un arquitecto vive aquí.

and

Mi hermano es un arquitecto.

can become, respectively:

Mi hermano que es arquitecto vive aquí.

Mi hermano es arquitecto.

but

El hombre es un tirano feroz

does not become:

*El hombre es tirano feroz.

It appears likely that this rule can be expanded so that an article can be deleted after certain other types of verbs:

Tienen examen.

* [T-16] NOUN MODIFIER - OPT.

$$\text{Description: } \begin{array}{cccccccc} X & D & N_{[+\text{Human}]} & que & Cop & \langle D \rangle & N_{[+\text{Prof}]} & Y \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$$

$$\text{Structural Change: } 1\ 2\ 3\ 4\ 5\ 6\ 7\ 8 \Longrightarrow 1\ 2\ 3\ 7\ 8$$

There appear to be three main types of noun plus noun constructions in Spanish. The first type involves apposition, as discussed in T-13 and T-14:

Valparaíso, puerto principal de Chile...

Compounds are the second type of noun plus noun construction, and there appear to be two kinds of compounds, differentiated by the type of plural formation the compound undergoes; e.g.:

1) la bocacalle	las bocacalles
2) la mesa escritorio	las mesas escritorio

Presumably these forms are a result of derivational processes and will not be handled in this study. The third type of noun-noun construction is of the sort accounted for by T-16; e.g.:

el molinero alcalde

T-16 also works on a possible result of the relativization transformation. It operates to place the predicate nominal of a sentence which has the feature [+Profession] immediately after a subject noun which has the feature [+Human]. Thus:

El rey que es un soldado es muy joven $\Longrightarrow$

El rey soldado es muy joven.

For some dialects this rule may not be restricted to nouns with just the features specified in the rule; e.g.:

Este libro que es un diccionario... $\Longrightarrow$

Este libro diccionario...

* [T-17] NOUN MODIFICATION - OPT.

$$\text{Description: } \begin{array}{cccccc} X & NP & que & Cop & Adj & Y \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array}$$

$$\text{Condition: } 5 = \begin{Bmatrix} +\text{Adj} \\ \text{V-dv}\langle s \rangle \end{Bmatrix}$$

Structural Change: 1 2 3 4 5 6 $\Longrightarrow$ 1 2 5 6

T-17 also applies to a possible result of the relativization rule. In this case, the adjective following a copula can be optionally introduced into the position after the subject noun. In this process the copula and the relative que are deleted. For example:

El hombre que es simpático... $\Longrightarrow$ El hombre simpático...

Since the agreement rule could not operate on this new construction it is clear that agreement must have been accomplished before T-17 operated and also before the relativization rule. Also since the past participles which can become adjectives by rule T-10 may also be operated on by T-17, this latter rule must apply at some time after T-10, e.g.:

Los hombres que están cansados... $\Longrightarrow$

Los hombres cansados...

The grammar will generate certain constructions twice, indicating that they are structurally ambiguous. For instance, lexical items like *católico*, *socialista*, etc. will have the feature [+Adjective] as well as the features [+Noun, +Profession], hence the string *Mi hermano católico* can be generated twice by making use of T-16 and T-17. The base rules generate:

1a) NP Cop NP

2a) NP Cop Adj

Lexical items are inserted:

1b) Mi hermano es un católico$_{[+\text{N},\ +\text{Prof}]}$

2b) Mi hermano es católico$_{[+\text{Adj}]}$

T-16 gives:

1c) Mi hermano católico 'My brother the Catholic'

while T-17 gives:

2c) Mi hermano católico 'My Catholic brother'

* [*T-18*] *REORDERING* - OPT.

Description: $\begin{array}{ccccc} X & D & N & \text{Adj} & Y \\ 1 & 2 & 3 & 4 & 5 \end{array}$

Condition: 4 $\neq$ Adj + Prep Phrase; $= \begin{Bmatrix} +\text{Adj} \\ \text{V-dv} \langle s \rangle \end{Bmatrix}$

Structural Change: 1 2 3 4 5 $\Longrightarrow$ 1 2 4 3 5

This rule operates on the result of T-17 and therefore must be ordered after it. T-18 optionally reorders a sequence of determiner plus noun plus adjective (or past participle) so that the latter element precedes the noun. Thus:

El hombre simpático $\Longrightarrow$ El simpático hombre

However, this rule can place only a simple adjective (or past participle) before the noun, so that

La cesta llena de papeles

cannot become:

*La llena de papeles cesta

The fact that a few adjectives have a different semantic interpretation when placed before the noun (e.g., *un hombre pobre* 'a poor man (financially)' vs. *un pobre hombre* 'a man worthy of pity') is presumably taken care of by the semantic features in the lexical entries for these items.

* [T-19] ADJECTIVE NOMINALIZATION (NOUN DELETION) - OPT.

$$\text{Description: } \begin{array}{ccccc} X & \text{Art}_{[+\text{Def}]} & N & \text{Adj} & Y \\ 1 & 2 & 3 & 4 & 5 \end{array}$$

$$\text{Structural Change: } 1\ 2\ 3\ 4\ 5 \Longrightarrow 1\ 2\ 4\ 5$$

T-19 applies to one of the possible results of T-17: a string which consists of definite article plus noun plus adjective, and serves to delete the noun:

El hombre simpático $\Longrightarrow$ El simpático

Notice that this rule applies only when the article is a definite article. That is, T-19 cannot operate on:

Un hombre simpático

to give

*Un simpático

Thus if we consider the following three forms:

hombre [+Noun]
simpático [+Adjective]
viejo [+Noun, +Adjective]

the base rules will give:

el hombre	un hombre
el viejo 'the old man'	un viejo, 'an old man'

and T-19 will give:

el simpático, but not *un simpático
el viejo 'the old one' but not *un viejo

These are the desired forms and the effect of the rules has been to say that lexical items with the features [+Noun] can occur after either the definite or indefinite article, while items with just the feature [+Adjective] may occur after only the definite article. An item like *viejo*, since it has both the feature [+Adjective] and the feature [+Noun], will occur after the definite article by means of two different patterns, and this construction of definite article plus *viejo* is therefore ambiguous. The construction generated by the base rules is interpreted as 'the old man' and the one which results from the application of T-19 is interpreted as 'the old one'. Notice also that T-19 does not say that *simpático* in *el simpático* has become a noun. This construction, as made clear by T-19, still consists of an article plus an adjective (between which a noun has been deleted).

* [T-20] MASCULINE ARTICLE PLUS FEMININE NOUN - OBLIG.

$$\begin{bmatrix}+\text{Art}\\ 2\text{Gender}\\ 1\text{Number}\end{bmatrix} \Longrightarrow \begin{bmatrix}+\text{Art}\\ 1\text{Gender}\\ 1\text{Number}\end{bmatrix} \Big/ \;\underline{\qquad}\; \begin{bmatrix}+\text{N}\\ 2\text{Gender}\\ 1\text{Number}\\ \text{[á...]}\end{bmatrix}$$

This transformation states that an article which has associated with it the features [2Gender, 1Number] (which it has acquired from an accompanying noun by means of T-5) replaces the feature [2Gender] by the feature [1Gender] when this article immediately precedes a feminine singular noun beginning with a stressed a (which will be given as part of a distinctive feature matrix, not as represented in this rule). Notice that T-20 must follow T-17, 18, 19 since a masculine singular article does not occur before the type of noun in question if an adjective intervenes. Thus we get:

El agua
El agua buena
La buena agua

but not:

*La agua
*La agua buena
*El buena agua

An alternative to including T-20 in the grammar would be to have a phonological rule utilizing features which would say that el and un are merely the representatives of feminine singular definite and indefinite articles before a noun beginning with a stressed a.

* [T-21] ARTICLE DELETION WITH MASS NOUNS - OPT.

Description: $NP\ V\ D\ N_{[-Count]}$
$1\ \ 2\ 3\ 4$

Structural Change: $1\ 2\ 3\ 4 \Longrightarrow 1\ 2\ 4$

T-21 can optionally operate on a string which contains a mass noun (i.e. a noun with the feature [-Count]) as the object, to delete the article before this noun. Since the noun phrase to which the rule applies is to object, T-21 must apply before the transformations that effect reordering (T-24, 28) and object deletion (T-22). A sentence such as:

Quiero el arroz.

or

Necesito el dinero.

can become, respectively:

Quiero arroz.
Necesito dinero.

* [T-22] OBJECT DELETION - OPT.

Description: $NP_1\ V_{[-Obj\ delete]}\ NP_2$
$1\ \ 2\ \ 3$

Structural Change: $1\ 2\ 3 \Longrightarrow 1\ 2$

This rule allows the optional deletion of an object NP, provided it follows a verb which allows object deletion (e.g., which has the feature [+Object delete] in its lexical entry). A sentence such as:

La mujer come el arroz.

can become

La mujer come.

but a sentence such as

Juan admira la sinceridad.

cannot become

*Juan admira.

Since the verb *admira-* has the feature [-Object delete] in its lexical entry, T-22 cannot apply to delete an NP which follows this verb.

This transformation must be ordered before T-24, which permutes the subject NP and the VP. If it were to follow T-24, two different descriptions of the position of the object would have to be given for the rule to apply. But ordered as it is, before T-24, while the object NP can still only occur in one place, the specification of the rule is much simpler. Similarly, this rule should precede T-23, which introduces the "personal *a*". If not, T-22 will have to specify that this *a*, if it is now present by T-23, will also have to be deleted in addition to the object Noun.

* [*T-23*] *PERSONAL 'A'*- OBLIG.

Description: $\underset{1}{NP}\ \underset{2}{V}_{[+'a']}\ \underset{3}{\langle D\rangle}\underset{4}{N}_{[+\text{Human}]}$

Structural Change: $1\ 2\ 3\ 4 \Longrightarrow 1\ 2\ a\ 3\ 4$

Rule T-23 states that the so-called "personal *a*" must be inserted before an object noun which has the feature

[+Human]. Furthermore, since the "personal a" is not inserted after certain verbs even though the object noun is human, T-23 must be specified to add 'a' after verbs which have the feature [+'a'] in their lexical entries, if they are followed by a human noun. Thus we have:

El hombre ve a Juan.

since ve will have the feature [+'a'], and we have

Tiene dos hermanos.

since the lexical entry for tiene- has the feature [-'a']. Clearly T-23 can be more simply specified if it is ordered before the reordering transformations (T-24, 28). However, as just mentioned, it should operate after T-22.

Notice, however, that this rule is inadequate since it does not account for the occurrence of both

Busco una secretaria...	'I'm looking for a (any) secretary'
Busco a una secretaria...	'I'm looking for a (particular) secretary'

One alternative is to say that the insertion of a is obligatory with definite articles and optional with indefinite articles, and to allow the semantic component to provide different interpretations for the sequences un and a un.

* [T-24] REORDERING - OPT.

Description: NP VP
$\quad\quad\quad\quad\quad\quad$ 1 $\quad$ 2

Structural Change: 1 2 ⟹ 2 1

T-24 is a very general rule for Spanish which says that the subject NP and the VP can be optionally permuted. A sentence such as:

El hombre canta.

becomes

Canta el hombre.

One such as:

El muchacho ve a la mujer.

becomes

Ve a la mujer el muchacho.

It is simpler to order T-24 after T-23 so that the "personal a" has already been inserted before the permutation takes place. Similarly, if an object NP is to be deleted (as in T-22) the rule for this operation is more easily specified if it occurs before the permutation operation.

* [T-25] SUBJECT DELETION - OPT.

Description: $\underset{1}{NP}\ \ \underset{2}{VP}$

Structural Change: $1\ 2 \Longrightarrow 2$

This transformation optionally deletes a subject noun phrase. For instance:

Los socialistas son interesantes.

becomes, by this rule:

Son interesantes.

Since by the agreement transformations T-4 and T-6 the verb and any adjective present in the VP must agree with the subject NP, T-25 cannot be ordered before these rules.

Furthermore the specifications which must be made in T-22 through T-24 are more easily given before T-25 applies.

* [T-26] OBJECT RELATIVIZATION - OBLIG.

Description: $\underset{1}{X}\ \underset{2}{NP_1}\ [\underset{3}{V}\ \underset{4}{\langle a \rangle}\ \underset{5}{NP_1}\ \underset{6}{\langle NP_2 \rangle}]\ \underset{7}{Y}$

Condition: 3 ⟨4⟩ 5 = VP

Structural Change: 1 2 3 4 5 6 7 $\Longrightarrow$ 1 2 que 3 6 7

This transformation allows us to account for the ambiguity of a sentence such as:

El hombre que ve es guapo.

in which el hombre can be either the subject or the object of the verb ve. In the first case, where el hombre is the subject, the base rules will operate to produce a generalized phrase-marker such as:

El hombre [El hombre ve María] es guapo

T-7 (relativization) will operate to produce:

El hombre que ve María es guapo.

T-22 (object deletion) will give:

El hombre que ve es guapo.

In the second case, where el hombre is the object of the verb ve, the base rules give:

El hombre [María ve el hombre] es guapo.

T-23 operates to insert a "personal a":

El hombre [María ve al hombre] es guapo.

T-25 will delete the subject of the lower phrase-marker:

El hombre [ve al hombre] es guapo.

Then T-26, the rule under consideration, embeds the lower phrase-marker into the upper one by deleting the repeated NP and inserting que:

El hombre que ve es guapo.

* [T-27] REORDERING - OPT.

Description: $\underset{1}{V_{[+\_\_\_NP]}}\ \underset{2}{NP_2}\ \underset{3}{NP_1}$

Condition: 1 2 = VP

Structural Change: 1 2 3 $\Longrightarrow$ 1 3 2

This rule operates optionally on the output of T-24, the reordering transformation, and serves to permute the subject and object NP's. For example:

Base rules:	María ve el hombre.
T-23:	María ve al hombre.
T-24:	Ve al hombre María.
T-28:	Ve María al hombre.

3.4 Phonological Rules

The phonological component consists of a sequence of rules which operate in a cycle on the surface structure (which results after the application of the transformational rules) to provide a phonetic representation of the sentence generated.

Only a few obligatory rules from the phonological component are presented in this grammar. These are almost all fairly early rules that provide the phonological correlates to the agreement operations of the transformational component.

* [PH-1] $\text{Formative}_{[+\text{Art},\ +\text{Def},\ 1\text{G},\ 1\text{No.}]} \Longrightarrow$ e + Formative

The first rule applies to a formative which is a definite article and which has acquired the features [1Gender, 1Number] from the noun with which it is associated. This rule serves to prefix an e (In a fully developed grammar all such phonological elements would be given in terms of a matrix of distinctive features. However, for simplicity of presentation, since phonological considerations are not the central interest of this study, distinctive feature notations are not utilized) to the element -l-, giving the masculine singular definite article el. This rule must be ordered before PH-2 in order to prevent the formative with the features specified from going through the second rule and resulting in lo.

* [PH-2] $\text{Formative}_{[1\text{G},\ 1\text{MC}]} \Longrightarrow$ Formative + o

The next rule, PH-2, applies to any formative which has the features [1Gender] (acquired from the co-occurring noun by T-4 in the case of adjectives and T-5 in the case of articles, or present in its lexical entry in the case of a noun), and [1MC] (an inherent feature of the lexical entry) and adds to this formative an o. The only types of formatives affected by this rule are nouns, adjectives and articles, as these are the only items which will have these features in the terminal string.

The feature [MC] is an inherent feature of nouns, adjectives and articles (which is given in their lexical entries) and refers to the type of ending, if any, added to a formative. After the agreement transformation (T-4, T-5) a formative with [1MC] has either o or a added to its underlying form (depending on whether it has [1Gender] or [2Gender]) by the phonological rules. Those with [2MC] have nothing added to their underlying form. Those with [3MC] have an e added.

Thus PH-2 will add o to items such as un-, buen- and muchach-, resulting in uno, bueno and muchacho. Notice that the definite article -l- when it is singular has already become el by PH-1 and will not be operated on by this rule. However, a formative with [+Art, +Def, 1Gender, 2Number] will have an o added by this rule, but will also have a final s obligatorily added later on (PH-7) to become los.

* [PH-3] $\text{Formative}_{[+\text{Apocope},\ 1\text{G},\ 1\text{No.}]} + \underline{o} \Longrightarrow \text{Formative} - \underline{o}\ /$

$\_\_\_ \ldots [-\text{N}]$ where $\_\_\_ \ldots [-\text{N}] = \text{NP}$.

The third phonological rule serves to drop the final o (added by PH-2) on a masculine singular adjective or a masculime singular indefinite article when they precede a noun in a noun phrase. Items that allow this sort of apocopation, such as un-, buen- and mal-, will be marked [+Apocope] in their lexical entries. Thus uno hombre after PH-2 becomes by PH-3 un hombre and uno bueno hombre becomes un buen hombre. Presumably limiting adjectives such as primero, tercero, alguno, ninguno, ciento and postrero will have the feature [+Apocope] in their lexical entries and will be operated on by this rule to give the desired apocopated forms in the proper environments.

* [PH-4] $\text{Formative}_{2G,\ 1MC]} \Longrightarrow \text{Formative} + a$

PH-4 operates in the same fashion as PH-2, but adds a final a to items which have the features [2Gender, 1MC]. Thus items such as un-, -l-, buen- and muchach- become respectively una, la, buena and muchacha.

Notice that an article which by T-5 acquired the features [2Gender, 1Number] from the noun it precedes will have the first feature changed to [1Gender] by T-19 if the accompanying noun is a feminine singular noun beginning with stressed a (orthographically a or ha). The phonological rule PH-1 will then operate on an article with the features [+Definite, 1Gender, 1Number] to give el before a feminine singular noun such as agua. PH-2 and PH-3 will operate on an article with the features [-Definite, 1Gender, 1Number] to give un before agua. PH-4 gives la- agua and una- agua, but if these forms happen to have the feature [2Number], PH-7 must obligatorily apply to give las aguas and unas aguas, and the unacceptable forms *la agua and *una agua are never generated by the grammar.

* [PH-5] $\text{Formative}_{[1G,\ 3MC]} \Longrightarrow \text{Formative} + e$

The fifth phonological rule, which is relevant for only a few items, states that forms with the features [1Gender, 3MC] will have a final e added. This rule takes care of nouns like monj- or jef- which can become either *monja* or *jefa* by PH-4 (if the features [2Gender, 1MC] are chosen) or *monje* or *jefe* by the rule under discussion (if the features [1Gender, 3MC] are chosen). Presumably the masculine singular demonstrative forms *este* and *ese* (which have corresponding neuter forms ending in *o*) will also be operated on by this rule.

Notice that any item which has the feature [2MC] in its lexical entry will not be operated on by the phonological rules presented so far; i.e., such items will not have a vowel added to their underlying forms. Thus lexical entries such as the adjective *azul* and the noun *hombre* will occur in the singular essentially as they do in the lexicon. For an item like *español-*, if the features [2Gender, 1MC] are chosen with this lexical item, PH-4 will operate to give *española*, the feminine form. However, if the features [1Gender, 2MC] are chosen with this lexical item, no rule will apply to add a vowel and we have the masculine singular form *español*.

* [*PH-6*] $\text{Formative}_{[+\text{V},\ 2\text{No.}]} \Longrightarrow \text{Formative} + \underline{n}$

The underlying form utilized for verbs in the lexicon is the third person singular (other persons and corresponding pronouns are presumably introduced by transformation). PH-6 applies to verbs which have picked up the feature [2Number] from the preceding subject noun by the verb agreement rule (T-6), and adds a final *n*; e.g.:

$\text{hombre}_{[+\text{N},\ 2\text{No.}]} \cdots \text{camina-}_{[+\text{V},\ldots]}$

T-6 hombre$_{[+N,\ 2No.]}$ ... camina-$_{[+V,\ 2No.]}$

PH-6 hombre$_{[+N,\ 2No.]}$ ... camina*n*

* [*PH-7*] Formative$_{[2No.]}$ $\Longrightarrow$ Formative + $\{\underline{s}\}$

The seventh phonological rule applies to any items which have the feature [2Number] and adds the plural *s*, which must be more exactly specified by a later phonological rule (see PH-8). Since this rule should apply only to articles, adjectives and nouns, it must be ordered after PH-6, in order to prevent the addition of an *s* to verbs (which also can have the feature [2Number] after the verb agreement transformation). PH-6 operates on and serves to eliminate all verbs with the feature [2Number], and PH-7 operates on only those items having the required feature which are left after PH-6 has applied. For example, when items such as *uno*, *lo*, *libro*, *bueno* (which following the agreement transformations can all have the features [1Gender, 2Number, 1MC]) appear in the surface structure, PH-7 will add a following *s*. This will result in *unos*, *los*, *libros* and *buenos*.

* [*PH-8*] $\{\underline{s}\} \longrightarrow \left\{\begin{array}{l} s/\substack{\check{V}\\ \acute{e}}\ \_\_\_ \\ \emptyset/\check{V}s\_\_\_ \\ es \end{array}\right\}$

PH-8, which actually would occur much later in the phonological rules, specifies that the substantive plural *s* has the form *s* after items that end in an unstressed vowel (*líbro-s*) or stressed *e* (*café-s*), the form zero after items that end in an unstressed vowel plus *s* (*lúnes-Ø*), and the form *es* everywhere else (*mujér-es*). [But see Foley, 1965, pp. 84-5]

4. CONCLUSIONS

In a transformational grammar, the notion of "class" is characterized by the relationship "is a", in the following manner [Chomsky, 1965, p. 84]: A lexical item is a member of a particular lexical category X if a feature [+X] is part of the set of syntactic features listed in the lexical entry for that item and is part of the complex symbol which the item replaces in forming a terminal string. The grammar itself thus provides a definition of the constructs Noun, Adjective, etc. which is satisfactory and the fact that nouns and adjectives cannot be distinguished by diagnostic environments (that is, that there are no air-tight frames in which only nouns and adjectives occur) is no longer disturbing, once we abandon the demand that these constructs be definable in terms of operational procedures. We see now the solution to the problem posed in section 2.2 of why _Juan_, _camas_ and _muchacho_ are indeed all members of the same class in spite of having no set of common frames.

The transformational grammar of Spanish discussed in section 3 and presented in Appendix 1 characterizes nouns and adjectives as follows. Nouns have the feature [+Noun] in their lexical entries, adjectives have the feature [+Adjective]. Some items, e.g., _viej-_, have both these features and therefore are members of two classes. Nouns are independently selected during the generation of the base rules, while the selection of adjectives (as well as determiners and verbs) is to some extent dependent on the nature (i.e., the feature specification) of the subject noun chosen. Number is an inherent feature of nouns which is selected during the operation of the base rules. Gender is an inherent feature that is present in a noun's lexical entry (rather than being a matter of inflection as has been claimed or implied by some analysts). Both these features, gender and number, are acquired by adjectives (and determiners) from the noun they accompany. Nouns, adjectives and determiners each have a feature specification for morphological class (MC) in their respective entries which partially determines (along with the gender feature) the phonological shape of the suffix they will take.

It is only after the operation of the base rules, the insertion of lexical items, and the operations of the transformational and phonological rules that we have nouns and adjectives as they are usually thought of. For instance, an adjective such as _bueno_/_a_ will be represented in the lexicon as _buen-_. Transformational agreement rules will associate with this item the noun's features of gender and number, which will then be operated on by the phonological rules with the result that a final _o_ or _a_ will be added to give _bueno_ or _buena_.

The ultimate justification of this characterization of Spanish nouns and adjectives will be provided by evaluating the general efficiency, simplicity, adequacy and explanatory power of a grammar which makes use of these postulated classes.

It will be noticed that we have now returned to a position with regard to classes which in at least one sense more closely resembles the semantic definition of Gili y Gaya [1961, p. 99] quoted in sections 1.1 and 2.4 than the formal definitions discussed in section 2.1. It is Chomsky's view that the traditional goal of universal grammar, as exemplified in the definition cited, namely the cross-linguistic characterization of lexical categories such as Noun, Adjective, etc., may possibly be realizable by a theory of transformational grammar which utilizes syntactic features. He suggests [1965, p. 116], for example, that the lexical category Noun could perhaps be defined in general linguistic theory as that category which is "selectionally dominant" in the sense that context-free subcategorization rules determine its feature specification and some of these features are associated by means of other rules with the feature specifications of other lexical categories.

This definition would make explicit, or provide a formal characterization for, the notion expressed in Gili y Gaya's semantic definition that nouns are independent while verbs and adjectives are dependent on nouns. Thus, a definition of word classes in terms of highly abstract underlying structures may provide a language-independent significance for the use of a category like Noun or Adjective, which was hinted at by traditional semantic definitions but which was not captured at all by means of definitions formulated in terms of surface structures.

Appendix 1. THE GRAMMAR

For ease of reference the rules discussed in section 3, along with a sample lexicon, are presented in this appendix.

A. BASE RULES

1. S ⟶ NP VP
2. VP ⟶ Aux $\left\{\begin{array}{l} \text{Copula} \left\{\begin{array}{l}\text{Pred}\\ \text{Adv}\\ \text{S'}\end{array}\right\} \\ \text{Verb} \ \langle \text{S'}\rangle \ \langle\text{NP}\rangle \end{array}\right\} \langle\text{Adv}\rangle$
3. Aux ⟶ T ⟨ha- + -do⟩ ⟨está- + -ndo⟩
4. Pred ⟶ $\left\{\begin{array}{l} \text{NP} \ \langle\text{Prep Phrase}\rangle \\ \langle\text{Adv}\rangle \left\{\text{Adj} \ \langle\text{Prep Phrase}\rangle\right\} \end{array}\right\}$
5. Prep Phrase ⟶ Prep NP
6. Prep ⟶ de, sin, ...
7. Adv ⟶ +Adv, C.S.
8. [+Adv] ⟶ $\left\{\begin{array}{l} \text{+Mann} \\ \text{+Loc} \\ \text{+Temp} \end{array}\right\}$
9. [+Mann] ⟶ $\left\{\begin{array}{l} \text{+Manner} \\ \text{por}\frown\text{PASS} \end{array}\right\}$
10. Copula ⟶ +Cop, C.S.
11. Verb ⟶ +V, C.S.
12. NP ⟶ ⟨Det⟩ Noun ⟨S'⟩
13. Noun ⟶ +N, $\left\{\begin{array}{l}1\\2\end{array}\right\}$Number, C.S.

14. [+N, +Det___⟨S'⟩] → [±Count]

15. [+Count] → [±Animate]

16. [+N, +___⟨S'⟩] → [±Animate]

17. [+Animate] → [±Human]

18. [+Det___⟨S'⟩, +Human] → [±Profession]

19. [+Det___⟨S'⟩, -Animate] → [±Event]

20. [-Count] → [±Abstract]

21. [+V] → C.S./[+N]...___⟨...[+N]⟩

22. [+Cop] → C.S./[+N]...___

23. Adj → +Adj, C.S./[+N]...___

24. Det → $\left\{\begin{matrix}\text{Article}\\ \text{Demonstrative}\\ \ldots\end{matrix}\right\}$

25. Article → +Art

B. LEXICON

abogádo	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, +Prof, 1Gender, 2MC
ábre-	+V, -Obj delete, +___NP⟨Adv⟩, -___, -___S', -___Adv, +(+Animate)___
admíra-	+V, -Obj delete, +'a', +___NP⟨Adv⟩, -___, -___S', -___Adv, +(+Animate)___
água	+N, +Det___⟨S'⟩, -___⟨S'⟩, -Count, -Abstract, 2Gender, 2MC
ahóra	+Adv, +Temp, -___Adj
aquí	+Adv, +Loc, -___Adj

arróz	+N, +Det___⟨S'⟩, -___ S' , -Count, -Abstract, 1Gender, 2MC, -2No.
atáca-	+V, +Obj delete, +'a', +___NP⟨Adv⟩, -___, -___S', -___Adv, +(+Animate)___
azúl	+Adj, 2MC
bién	+Adv, +Mann, +Manner, +Cop___Adj, +Cop___$^{\#}$, +Verb___$^{\#}$, -Cop Adv___$^{\#}$
buén-	+Adj, +Apocope, 1MC
cáma	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, -Animate, -Event, 2Gender, 2MC
camína-	+V, +Motion, -___NP, +___, +___S'⟨Adv⟩, +___Adv, +(+Animate)___
crée-	+V, +Obj delete, +'a', +___NP⟨Adv⟩, -___, +___S', -___Adv, +(+Human)___
desayúno	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, -Animate, $\left\{\pm\right\}$Event, 1Gender, 2MC
díce-	+V, -Obj delete, +___NP⟨Adv⟩, -___, +___S', -___Adv, +(+Human)___
duérme-	+V, -Motion, -___NP, +___, -___S', +___Adv, +(+Animate)___
es-	+Cop, +___NP, +___⟨(+Mann)⟩ Adj, +___S', -___(+Manner), -(-Event)___(+Loc), +(+Event)___(+Temp), +(+Event)___(+Loc), -(-Event)___(+Temp)
España	+N, -Det___⟨S'⟩, +___⟨S'⟩, -Animate, -Event, 2Gender, 2MC
españól-	+N, +Det___⟨S'⟩ , -___⟨S'⟩, +Count, +Animate, +Human, +Prof, +Adj, $\left\{\begin{matrix}\text{1Gender, 2MC}\\ \text{2Gender, 1MC}\end{matrix}\right\}$

está-	+Cop, -___NP, +___《+Manner》 Adj, +___S', +___(+Manner)$^{\#}$, +(-Event)___(+Loc), -(+Event)___(+Temp), -(+Event)___(+Loc), +(-Event)___(+Temp)
Fído	+N, -Det___⟨S'⟩, +___⟨S'⟩, +Animate, -Human, 1Gender, 2MC
furiós-	+Adj, -Apocope, 1MC
guáp-	+Adj, +(+Human)...___, -Apocope, 1MC
hermán-	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, -Prof, $\left\{\begin{matrix}1\\2\end{matrix}\right\}$Gender, 1MC
hómbre	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, -Prof, 1Gender, 2MC
Juán-	+N, -Det___⟨S'⟩, +___⟨S'⟩, +Animate, +Human, -Prof, $\left\{\begin{matrix}\text{1Gender, 2MC}\\\text{2Gender, 1MC}\end{matrix}\right\}$
-l-	+Art, +Def, -Apocope, 1MC
lént-	+Adj, -Apocope, 1MC
líbro	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, -Animate, -Event, 1Gender, 2MC
modélo	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, +Prof, $\left\{\begin{matrix}1\\2\end{matrix}\right\}$Gender, 2MC
mónj-	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, +Prof, $\left\{\begin{matrix}\text{1Gender, 3MC}\\\text{2Gender, 1MC}\end{matrix}\right\}$
mujér	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, -Prof, 2Gender, 2MC
múy	+Adv, +Mann, +Manner, +Cop___Adj, -Cop___$^{\#}$, -Verb___$^{\#}$, +___Adv

paréce-	+Cop, -___NP, +___⟪(+Manner)⟫ Adj, +___S', -___Adv$^{\#}$
pérr-	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, -Human, $\begin{Bmatrix}1\\2\end{Bmatrix}$Gender, 1MC
rosário	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, -Animate, +Event, 1Gender, 2MC
se-háce-	+Cop, -___Adj, +___S', -___Adv$^{\#}$, +(+Human)___, +___(+Human)
se-póne-	+Cop, -___NP, +___⟪(+Manner)⟫ Adj, +___S', -___Adv$^{\#}$
simpátic-	+Adj, +(+Human)...___, -Apocope, 1MC
sinceridád	+N, +Det___⟨S'⟩, -___⟨S'⟩, -Count, +Abstract, 2Gender, 2MC
socialísta	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, +Prof, +Adj, $\begin{Bmatrix}1\\2\end{Bmatrix}$Gender, 2MC
suélta-	+V, -Obj delete, +'a', +___NP⟨Adv⟩, -___, -___S', -___Adv
tiéne-	+V, -Obj delete, -'a', -___NP(+Mann), +___NP⟪(+Loc)⟫, +___NP⟪(+Temp)⟫, -___, -___S', -___Adv
tirán-	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, +Prof, +Adj, -Apocope, $\begin{Bmatrix}1\\2\end{Bmatrix}$Gender, 1MC
trabajadór-	+N, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, +Prof, +Adj, 1Gender, 2MC 2Gender, 1MC
ún-	+Art, -Def, +Apocope, 1MC

viud- $\quad$ +N, +Det___ $\langle S' \rangle$, -___ $\langle S' \rangle$, +Count, +Animate, +Human, -Prof, $\left\{\begin{matrix}1\\2\end{matrix}\right\}$Gender, 1MC

C. TRANSFORMATIONAL RULES

1. PASSIVE - OBLIG.

$$\text{Description: } \begin{array}{cccccc} NP_1 & Aux & V & NP_2 & \text{por}^\frown & \text{PASS} \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array}$$

$$\text{Structural Change: } 1\ 2\ 3\ 4\ 5\ 6 \longrightarrow 4\ 2\ \text{ser} + \text{-d-}\ 3\ 5\ 1$$

2. AGENT DELETION - OPT.

$$\text{Description: } \begin{array}{ccccc} NP_2 & Aux & \underbrace{\text{ser} + \text{-d-}} & V & \underbrace{\text{por } NP_1} \\ 1 & 2 & 3 & 4 & 5 \end{array}$$

$$\text{Structural Change: } 1\ 2\ 3\ 4\ 5 \Longrightarrow 1\ 2\ 3\ 4$$

3. AFFIX SHIFT - OBLIG.

$$\text{Description: } \begin{array}{cc} \text{Affix} & \text{Stem} \\ 1 & 2 \end{array}$$

Condition: Affix = -d-, -do, -ndo, T

Stem = V, se-V, Cop, ha-, está-

$$\text{Structural Change: } 1\ 2 \Longrightarrow 2\ 1$$

4. ADJECTIVE (AND PAST PARTICIPLE) AGREEMENT - OBLIG.

$$\left\{\begin{matrix}[+\text{Adj}]\\ \text{V-d}\end{matrix}\right\} \Longrightarrow \begin{bmatrix}\alpha\,\text{Gender}\\ \beta\,\text{Number}\end{bmatrix} \Big/ \begin{bmatrix}+\text{N}\\ \alpha\,\text{Gender}\\ \beta\,\text{Number}\end{bmatrix} \cdots \_\_\_,$$

$$\text{where N Cop} \left\{\begin{matrix}\text{Adj}\\ \text{V-d } \langle \text{por NP} \rangle\end{matrix}\right\} \text{ is an } \underline{S}$$

5. ARTICLE AGREEMENT - OBLIG.

$$[+\text{Art}] \Longrightarrow \begin{bmatrix}\alpha\text{Gender}\\ \beta\text{Number}\end{bmatrix} \Big/ \underline{\qquad} \begin{bmatrix}+\text{N}\\ \alpha\text{Gender}\\ \beta\text{Number}\end{bmatrix}$$

6. VERB AGREEMENT - OBLIG.

$$[+\text{V}] \Longrightarrow [\alpha\text{Number}] \Big/ \begin{bmatrix}+\text{N}\\ \alpha\text{Number}\end{bmatrix} \underline{\qquad}\ldots, \text{ where } \langle\text{D}\rangle\ \text{N V} \ldots \text{ is an } \underline{\text{S}}$$

7. RELATIVIZATION - OBLIG.

$$\text{Description: } \begin{array}{cccccc} \text{X} & \text{NP}_1 & [\text{NP}_1 & \text{VP}] & \text{Y} \\ 1 & 2 & 3 & 4 & 5 \end{array}$$

Condition: 2 = 3

Structural Change: 1 2 3 4 5 $\Longrightarrow$ 1 2 que 4 5

8. NOUN DELETION IN RELATIVE - OPT.

$$\text{Description: } \begin{array}{cccccc} \text{X} & \text{Art}_{[+\text{Def}]} & \text{N} & \text{que} & \text{VP} & \text{Y} \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array}$$

Structural Change: 1 2 3 4 5 6 $\Longrightarrow$ 1 2 4 5 6

9. NUMBER PLUS NOUN OR ADJECTIVE - OPT.

$$\text{Description: } \begin{array}{ccccc} \text{X} & \text{No.} & \text{que} & \text{Cop} \\ 1 & 2 & 3 & 4 \end{array} \left\{\begin{array}{cc} \text{Adj} & \\ 5 & \\ \text{D} & \text{N} \\ 6 & 7 \end{array}\right\} \begin{array}{c} \text{Y} \\ 8 \end{array}$$

$$\text{Structural Change: } 1\ 2\ 3\ 4 \left\{\begin{array}{cc} 5 & \\ 6 & 7 \end{array}\right\} 8 \Longrightarrow 1\ 2 \left\{\begin{array}{c} 5 \\ 7 \end{array}\right\} 8$$

10. PAST PARTICIPLES AS ADJECTIVES - OBLIG.

$$\text{Description: } \begin{array}{ccccccccc} \text{X} & \text{NP}_2 & \text{Cop} & [\text{NP}_2 & \text{ser} & \underbrace{\text{V-dv}\langle\text{s}\rangle} & \underbrace{\langle\text{por NP}_1\rangle} &] & \text{Y} \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & & 8 \end{array}$$

Condition: 2 = 4

Structural Change: 1 2 3 4 5 6 7 8 $\Longrightarrow$ 1 2 3 6 7 8

11. ADVERB DROPS -mente - OPT.

Description: $\begin{array}{cccccc} \text{NP} & \text{V} & \langle\text{NP}\rangle & [+\text{Mann} & (\text{Adj} - & \text{mente})] \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array}$

Condition: $5 = \begin{Bmatrix} +\text{Adj} \\ \text{V-dv}\ \langle s\rangle \end{Bmatrix}$

Structural Change: $1\ 2\ 3\ 4\ 5\ 6 \Longrightarrow 1\ 2\ 3\ 5_{[+\ \text{lGender}]}$

12. VERB PLUS ADJECTIVE - OBLIG.

Description: $\begin{array}{ccccc} \text{NP}_1 & \text{V}_{[+\text{Motion}]} & [\text{NP}_1 & \text{Cop} & \text{Adj}] \\ 1 & 2 & 3 & 4 & 5 \end{array}$

Condition: $1 = 3$

Structural Change: $1\ 2\ 3\ 4\ 5 \Longrightarrow 1\ 2\ 5$

13. APPOSITION - OPT.

Description: $\begin{array}{cccccc} \text{X} & \text{NP}_1 & \text{que} & \text{Cop} & \text{NP}_2 & \text{Y} \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array}$

Structural Change: $1\ 2\ 3\ 4\ 5\ 6 \Longrightarrow 1\ 2,\ 5,\ 6$

14. ARTICLE DELETION WITH APPOSITION - OPT.

Description: $\begin{array}{cccccc} \text{X} & \text{NP}_1, & \text{D} & \text{N} & \text{W}, & \text{Y} \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array}$

Structural Change: $1\ 2\ 3\ 4\ 5\ 6 \Longrightarrow 1\ 2\ 4\ 5\ 6$

15. ARTICLE DELETION IN PREDICATE NOMINAL - OPT.

Description: $\begin{array}{cccccccc} \text{X} & \text{D} & \text{N} & \langle\text{que}\rangle & \text{Cop} & \text{D} & \text{N} & \text{Y} \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$

Condition: $8 = \begin{Bmatrix} \text{VP} \\ \emptyset \end{Bmatrix}$

Structural Change: $1\ 2\ 3\ 4\ 5\ 6\ 7\ 8 \Longrightarrow 1\ 2\ 3\ 4\ 5\ 7\ 8$

16. NOUN MODIFIER - OPT.

Description: $\begin{array}{llllllll} X & D & N_{[+\text{Human}]} & \text{que} & \text{Cop} & \langle D\rangle & N_{[+\text{Prof}]} & Y \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \end{array}$

Structural Change: $1\ 2\ 3\ 4\ 5\ 6\ 7\ 8 \Longrightarrow 1\ 2\ 3\ 7\ 8$

17. NOUN MODIFICATION - OPT.

Description: $\begin{array}{llllll} X & NP & \text{que} & \text{Cop} & \text{Adj} & Y \\ 1 & 2 & 3 & 4 & 5 & 6 \end{array}$

Condition: $5 = \left\{\begin{array}{l} +\text{Adj} \\ \text{V-dv}\ \langle s\rangle \end{array}\right\}$

Structural Change: $1\ 2\ 3\ 4\ 5\ 6 \Longrightarrow 1\ 2\ 5\ 6$

18. REORDERING - OPT.

Description: $\begin{array}{lllll} X & D & N & \text{Adj} & Y \\ 1 & 2 & 3 & 4 & 5 \end{array}$

Condition: $4 \neq \text{Adj} + \text{Prep Phrase}; = \left\{\begin{array}{l} +\text{Adj} \\ \text{V-dv}\ \langle s\rangle \end{array}\right\}$

Structural Change: $1\ 2\ 3\ 4\ 5 \Longrightarrow 1\ 2\ 4\ 3\ 5$

19. ADJECTIVE NOMINALIZATION (NOUN DELETION) - OPT.

Description: $\begin{array}{lllll} X & \text{Art}_{[+\text{Def}]} & N & \text{Adj} & Y \\ 1 & 2 & 3 & 4 & 5 \end{array}$

Structural Change: $1\ 2\ 3\ 4\ 5 \Longrightarrow 1\ 2\ 4\ 5$

20. MASCULINE ARTICLE PLUS FEMININE NOUN - OBLIG.

$$\begin{bmatrix} +\text{Art} \\ 2\text{Gender} \\ 1\text{Number} \end{bmatrix} \Longrightarrow \begin{bmatrix} +\text{Art} \\ 1\text{Gender} \\ 1\text{Number} \end{bmatrix} \Big/ \underline{\qquad} \begin{bmatrix} +\text{N} \\ 2\text{Gender} \\ 1\text{Number} \\ [\text{á}\ldots] \end{bmatrix}$$

21. ARTICLE DELETION WITH MASS NOUNS - OPT.

Description: $\begin{array}{llll} \text{NP} & \text{V} & \text{D} & \text{N}_{[-\text{Count}]} \\ 1 & 2 & 3 & 4 \end{array}$

Structural Change: $1\ 2\ 3\ 4 \Longrightarrow 1\ 2\ 4$

22. OBJECT DELETION - OPT.

Description: $\begin{array}{lll} \text{NP}_1 & \text{V}_{[+\text{Obj delete}]} & \text{NP}_2 \\ 1 & 2 & 3 \end{array}$

Structural Change: $1\ 2\ 3 \Longrightarrow 1\ 2$

23. PERSONAL 'A' - OBLIG.

Description: $\begin{array}{llll} \text{NP} & \text{V}_{[+\text{'a'}]} & \langle \text{D} \rangle & \text{N}_{[+\text{Human}]} \\ 1 & 2 & 3 & 4 \end{array}$

Structural Change: $1\ 2\ 3\ 4 \Longrightarrow 1\ 2\ \text{a}\ 3\ 4$

24. REORDERING - OPT.

Description: $\begin{array}{ll} \text{NP} & \text{VP} \\ 1 & 2 \end{array}$

Structural Change: $1\ 2 \Longrightarrow 2\ 1$

25. SUBJECT DELETION - OPT.

Description: $\begin{array}{ll} \text{NP} & \text{VP} \\ 1 & 2 \end{array}$

Structural Change: $1\ 2 \Longrightarrow 2$

26. OBJECT RELATIVIZATION - OBLIG.

Description: $\begin{array}{lllllllll} \text{X} & \text{NP}_1 & [\text{V} & \langle \text{a} \rangle & \text{NP}_1 & \langle \text{NP}_2 \rangle &] & \text{Y} \\ 1 & 2 & 3 & 4 & 5 & 6 & & 7 \end{array}$

Condition: $3\ \langle 4 \rangle\ 5 = \text{VP}$

Structural Change: $1\ 2\ 3\ 4\ 5\ 6\ 7 \Longrightarrow 1\ 2\ \text{que}\ 3\ 6\ 7$

27. REORDERING - OPT.

Description: $\underset{1}{V_{[+\_\_\_NP]}}\ \underset{2}{NP_2}\ \underset{3}{NP_1}$

Condition: 1 2 = VP

Structural Change: 1 2 3 $\Longrightarrow$ 1 3 2

D. PHONOLOGICAL RULES

1. $\text{Formative}_{[+\text{Art},\ +\text{Def},\ 1\text{G},\ 1\text{No.}]} \Longrightarrow \underline{e} + \text{Formative}$

2. $\text{Formative}_{[1\text{G},\ 1\text{MC}]} \Longrightarrow \text{Formative} + \underline{o}$

3. $\text{Formative}_{[+\text{Apocope},\ 1\text{G},\ 1\text{No.}]} + \underline{o} \Longrightarrow \text{Formative} - \underline{o}\ /$

$\_\_\_\ldots[+N]$ where $\_\_\_\ldots[+N] = NP$

4. $\text{Formative}_{[2\text{G},\ 1\text{MC}]} \Longrightarrow \text{Formative} + \underline{a}$

5. $\text{Formative}_{[1\text{G},\ 3\text{MC}]} \Longrightarrow \text{Formative} + \underline{e}$

6. $\text{Formative}_{[+\text{V},\ 2\text{No.}]} \Longrightarrow \text{Formative} + \underline{n}$

7. $\text{Formative}_{[2\text{No.}]} \Longrightarrow \text{Formative} + \{\underline{s}\}$

8. $\{\underline{s}\} \longrightarrow \left\{\begin{array}{l} s/\begin{matrix}\check{V}\\ \acute{e}\end{matrix}\ \_\_\_ \\ \emptyset/\check{V}s\_\_\_ \\ es \end{array}\right\}$

Appendix 2. SAMPLE DERIVATION

In this appendix a sample derivation of the sentence El hombre simpático duerme aquí is presented which illustrates the workings of the grammar of Appendix 1. Each line of the derivation is obtained from the preceding line by the application of the rule indicated at the left-hand margin. (A notation such as [+Noun, ...] indicates that the set of features enclosed in the square brackets has had nothing added to it since the last line in the derivation when it was written out completely.)

First the base rules will operate to produce a preterminal string:

S

1. NP VP
2. NP Verb Adv
7. NP Verb [+Adv, +Verb___]
8. NP Verb [+Adv, +Verb___, +Loc]
11. NP [+Verb, +___Adv] [+Adv,...]
12. Det N S' [+Verb,...] [+Adv,...]
13. Det [+Noun, 1No., +Det___S'] S' [+Verb,...] [+Adv,...]
14. Det [+Noun, 1No., +Det___S', +Count] S' [+Verb,...]
    [+Adv,...]
15. Det [+Noun, 1No., +Det___S', +Count, +Animate] S'
    [+Verb,...] [+Adv,...]

17. Det [+Noun, 1No., +Det___S', +Count, +Animate, +Human]
S' [+Verb,...] [+Adv,...]

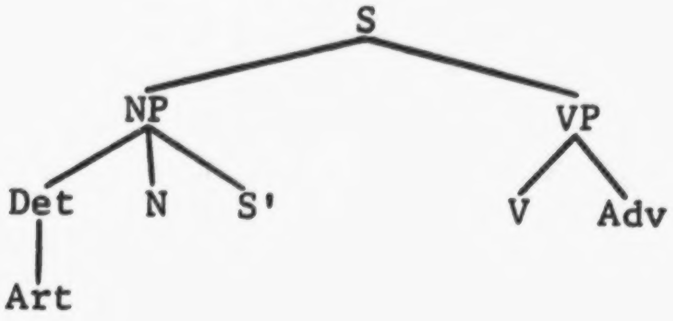
18. Det [+Noun, 1No., +Det___S', +Count, +Animate, +Human, -Prof] S' [+Verb,...] [+Adv,...]

21. Det [+Noun,...] S' [+Verb, +___Adv, +(+Animate)___] [+Adv,...]

24. Art [+Noun,...] S' [+Verb,...] [+Adv,...]

25. [+Art] [+Noun,...] S' [+Verb,...] [+Adv,...]

A tree representation of the string generated up to this point in the derivation (without the features indicated) would be:



The base rules now reapply to the occurrence of S which was introduced by rule 12. In order to mechanically simplify the presentation of this derivation, three dots (...) will be used to represent the parts of the string which have been generated so far surrounding S (as above). Thus the last line in the derivation above would be represented: ... S' ...

1. ... 【NP VP】 ...

2. ... 【NP Cop Pred】 ...

4. ... 【NP Cop Adj】 ...

10. ... 【NP [+Cop, +___Adj] Adj】 ...

12. ... 【Det N [+Cop,...] Adj】 ...

13. ... 【Det [+Noun, 1No., +Det___] [+Cop,...] Adj】 ...

14. ... 【Det [+Noun, 1No., +Det___, +Count] [+Cop,...] Adj】 ...

15. ... 【Det [+Noun, 1No., +Det___, +Count, +Animate] [+Cop,...] Adj】 ...

17. ... 【Det [+Noun, 1No., +Det___, +Count, +Animate, +Human] [+Cop,...] Adj】 ...

18. ... 【Det [+Noun, 1No., +Det___, +Count, +Animate, +Human, -Prof] [+Cop,...] Adj】 ...

22. ... 【Det [+Noun,...] [+Cop, +___Adj, +(+Animate)___] Adj】 ...

23. ... 【Det [+Noun,...] [+Cop,...] [+Adj, +(+Human)...___]】 ...

24. ... 【Art [+Noun,...] [+Cop,...] [+Adj,...]】 ...

25. ... 【[+Art] [+Noun,...] [+Cop,...] [+Adj,...]】 ...

The base rules have now generated the following pre-terminal string:

[+Art] [+Noun, 1No., +Det___S', +Count, +Animate, +Human, -Prof] 【[+Art] [+Noun, 1No., +Det___, +Count, +Animate, +Human, -Prof] [+Cop, +___Adj, +(+Animate)___] [+Adj, +(+Human)...___]】 [+Verb, +___Adv, +(+Animate)___] [+Adv, +Verb___, +Loc]

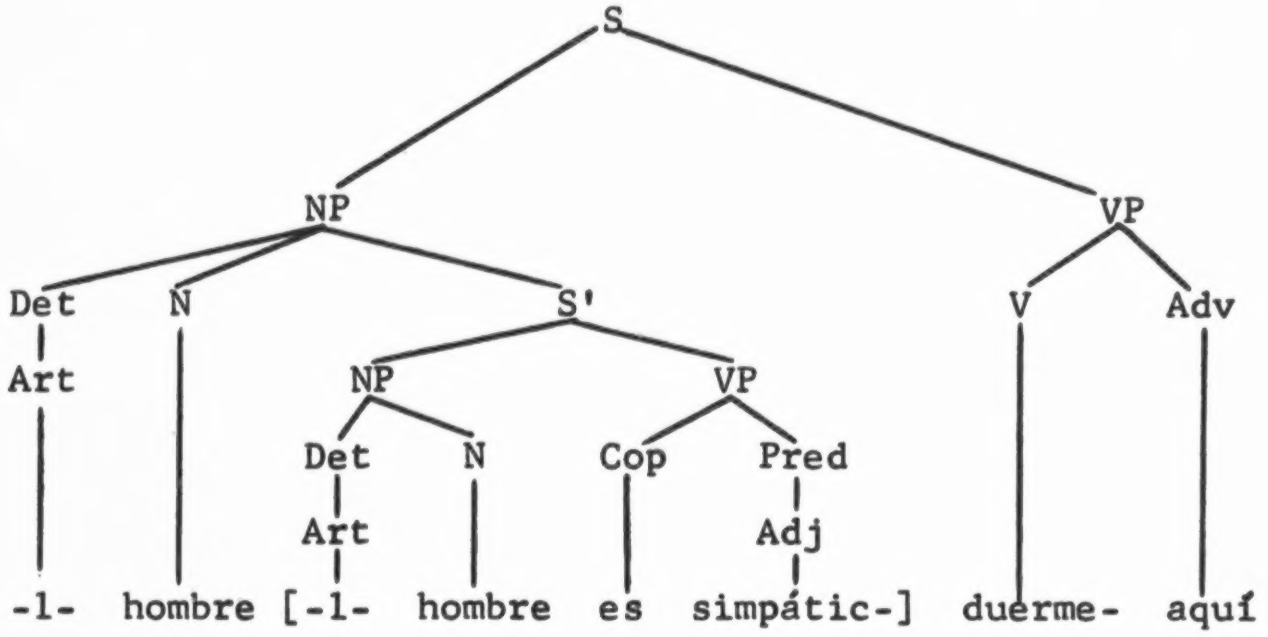
From the lexicon the following items can be selected to be inserted in the proper positions in the pre-terminal string above:

-l-	+Art, +Def, -Apocope, 1MC
hombre	+Noun, +Det___⟨S'⟩, -___⟨S'⟩, +Count, +Animate, +Human, -Prof, 1Gender, 2MC
es	+Cop, +___NP, +___⟨⟨(+Mann)⟩⟩ Adj, +___S', -___(+Manner), ...
simpátic-	+Adj, +(+Human)...___, -Apocope, 1MC
duerme-	+Verb, -Motion, -___NP, +___, -___S', +___Adv, +(+Animate)___
aquí	+Adv, +Loc, -___Adj

Inserting the lexical items (whose feature specifications accompany them), we have:

Art N Art N Cop Adj V Adv
-l- hombre [-l- hombre es simpátic-] duerme- aquí

A tree representation of the string at this point would be:


S
NP
VP
Det
N
S'
V
Adv
Art
NP
VP
Det
N
Cop
Pred
Art
Adj
-l- hombre [-l- hombre es simpátic-] duerme- aquí

The rules of the transformational component now apply to this terminal string, operating first on the lowest occurrence of S:

4. -l-$_{[1MC]}$ hombre$_{[1G, 1No., 2MC]}$ [-l-$_{[1MC]}$ hombre$_{[1G, 1No., 2MC]}$ es simpátic-$_{[1G, 1No., 1MC]}$] duerme- aquí

5. -l-$_{[1MC]}$ hombre$_{[1G, 1No., 2MC]}$ [-l-$_{[1G, 1No., 1MC]}$ hombre$_{[1G, 1No., 2MC]}$ es simpátic-$_{[1G, 1No., 1MC]}$] duerme- aquí

6. -l-$_{[1MC]}$ hombre$_{[1G, 1No., 2MC]}$ [-l-$_{[1G, 1No., 1MC]}$ hombre$_{[1G, 1No., 2MC]}$ es$_{[1No.]}$ simpátic-$_{[1G, 1No., 1MC]}$] duerme- aquí

7. -l-$_{[1MC]}$ hombre$_{[1G, 1No., 2MC]}$ que es$_{[1No.]}$ simpátic-$_{[1G, 1No., 1MC]}$ duerme- aquí

17. -l-$_{[1MC]}$ hombre$_{[1G, 1No., 2MC]}$ simpátic-$_{[1G, 1No., 1MC]}$ duerme- aquí

The cycle of transformational rules now reapplies to the string dominated by the initial S:

5. -l-$_{[1G, 1No., 1MC]}$ hombre$_{[1G, 1No., 2MC]}$ simpátic-$_{[1G, 1No., 1MC]}$ duerme- aquí

6. -l-$_{[1G, 1No., 1MC]}$ hombre$_{[1G, 1No., 2MC]}$ simpátic-$_{[1G, 1No., 1MC]}$ duerme-$_{[1No.]}$ aquí

The rules of the phonological component now apply to the surface structure:

-l- hombre simpátic- duerme- aquí

to yield:

1. el hombre simpátic- duerme- aquí
2. el hombre simpático duerme aquí

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